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(54) **THERAPEUTIC PHARMACEUTICAL COMPOSITION FOR CANCER INCLUDING miRNA**

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(30) **Foreign Application Priority Data**

Nov. 9, 2017 (JP) 2017-216336

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C07H 21/04	(2006.01)
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A61K 47/42	(2017.01)
A61P 35/00	(2006.01)
C12N 15/113	(2010.01)
A61K 45/06	(2006.01)

(52) **U.S. Cl.**
CPC *A61K 31/713* (2013.01); *A61K 47/42* (2013.01); *A61P 35/00* (2018.01); *C12N 15/113* (2013.01); *A61K 45/06* (2013.01); *C12N 2310/141* (2013.01)

(58) **Field of Classification Search**
CPC C12N 15/113; C12N 2310/141
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2009/0202624 A1	8/2009	Inazawa et al.	
2009/0246875 A1	10/2009	Yamanaka	C12N 5/0696
			435/455
2010/0227909 A1	9/2010	Cleary et al.	
2011/0076768 A1	3/2011	Inazawa et al.	
2012/0157334 A1	6/2012	Beaudenon-Huibregtse et al.	
2012/0315640 A1	12/2012	Tahara	
2014/0154303 A1	6/2014	Tan et al.	
2015/0147384 A1*	5/2015	Koutsopoulos	A61K 9/1075
			514/44 R

FOREIGN PATENT DOCUMENTS

CA	2977624 A1	9/2016		
EP	2088208 A1	8/2009		
JP	2008239596 A	10/2008		
JP	2010222338 A	10/2010		
JP	2015519374 A	7/2015		
WO	2010078037 A2	7/2010		
WO	WO 2011/057003 A2	5/2011	....	C12N 2310/141
WO	2012108843 A1	8/2012		
WO	WO 2014/125277 A1	8/2014	....	C12N 2310/141
WO	2015020122 A1	2/2015		

OTHER PUBLICATIONS

Krutzfeldt et al. (Nucleic Acids Research, 2007, 35, 9, 2885-2892).*
Zou et al. (The Journal of Biological Chemistry, 287, 6, 4148-4156, 2012).*
Stenvang et al. (Seminars in Cancer Biology, 18, 2, 2008, 89-102).*
Dessie et al. (2018 IEEE 18th International Conference on Bioinformatics and Bioengineering (BIBE), Taichung, Taiwan, 2018, pp. 263-268).*
Veit et al. (Anticancer Research, 35, 1271-1278, 2015).*
Fu Dewang et al: "MiR 631/ZAP70: A novel axis in the migration and invasion of prostate cancer cells" Biochemical and Biophysical Research Communications, 469(3):345-351 2016.
Lisheng Zhang et al: "MicroRNA 657 promotes tumorigenesis in a hepatocellular carcinoma by targeting transducin-like enhancer protein 1 through nuclear factor kappa B pathways" Hepatology, 57(5):1919-1930 2013.
Xi Hao et al: "hsa-miR-631 resensitizes bortezomib resistant multiple myeloma cell lines by inhibiting UbcH10" Oncology Reports, 37(2):961-968 2016.
Godbole et al. (Cancer Biology & Therapy, Sep. 2017, 8, 10, 801-805).
Mohammed et al. (Nature, 2015, 523, 313-317).
International Preliminary Report on Patentability, PCTJP18041139, mailed May 12, 2020, 5 pages.
International Search Report and Written Opinion corresponding to PCTJP18041139, mailed Feb. 5, 2019, 7 pages.
He et al. "MIR-137 silencing of BRD4 suppresses oral squamous cell carcinoma cells proliferation, migration and invasion" Int. J. Clin. Exp. Pathol., 10(1):409-416 2017.
Kinehara et al. "Growth suppression of cancer cells by senescence-inducible miRNA" Tissue Culture Research Communication, 35(1):85 2016.

(Continued)

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(74) *Attorney, Agent, or Firm* — Myers Bigel, P.A.

(57) **ABSTRACT**

The object of the present invention is to find a pharmaceutical having strong cancer therapeutic effect. The present invention provides a pharmaceutical composition for cancer therapy comprising a transcription or processing product of a gene encoding a miRNA, wherein said miRNA is one or more miRNAs selected from the group consisting of miR-3140, miR-137, miR-631, and miR-657, pharmaceutical composition.

10 Claims, 33 Drawing Sheets

Specification includes a Sequence Listing.

(56) **References Cited**

OTHER PUBLICATIONS

Tonouchi et al. "miR-3140 suppresses tumor cell growth by targeting BRD4 via its coding sequence and downregulates the BRD4-NUT fusion oncoprotein" Scientific Reports, 8:4482, 13 pages 2018.

Krutzfeldt, Jan , et al., "Specificity, duplex degradation and subcellular localization of antagomirs", Nucleic Acids Research, vol. 35, No. 9, 2007, 2885-2892.

Li, Pei , et al., "MicroRNAs in laryngeal cancer: implications for diagnosis, prognosis and therapy", Am J Transl Res, 2016, 1935-1944.

Zhang, Lisheng , et al., "MicroRNA-657 Promotes Tumorigenesis in Hepatocellular Carcinoma by Targeting Transducin-Like Enhancer Protein 1 Through Nuclear Factor Kappa B Pathways", 2013, 1919-1930.

Guo, Jinling , et al., "miR-13 7 suppresses cell growth in ovarian cancer by targeting AEG-1", Biochemical and Biophysical Research Communications 441:357-363 (Oct. 19, 2013).

Liu, Li-Li , et al., "FoxD3-regulated microRNA-137 suppresses tumour growth and metastasis in human hepatocellular carcinoma by targeting AKT2", Oncotarget 5(13):5113-5124 (Jun. 10, 2014).

Peng, Yong , et al., "The role of MicroRNAs in human cancer", Signal Transduction and Targeted Therapy 1, 15004 (Jan. 28, 2016) 9 pages.

Sun, Jie , et al., "MIR-137 inhibits proliferation and angiogenesis of human glioblastoma cells by targeting EZH2", J Neurooncol 122:481-489 (May 5, 2015).

Zhang, Huimin , et al., "MicroRNA-137 is negatively associated with clinical outcome and regulates tumor development through EZH2 in cervical cancer", J Cell Biochem. 119:938-947 (Jul. 5, 2017).

Zhu, Xiaolan , et al., "miR-137 inhibits the proliferation of lung cancer cells by targeting Cdc42 and Cdk6", FEBS Letters 587:73-81 (2013).

* cited by examiner

Fig. 1

Fig. 2

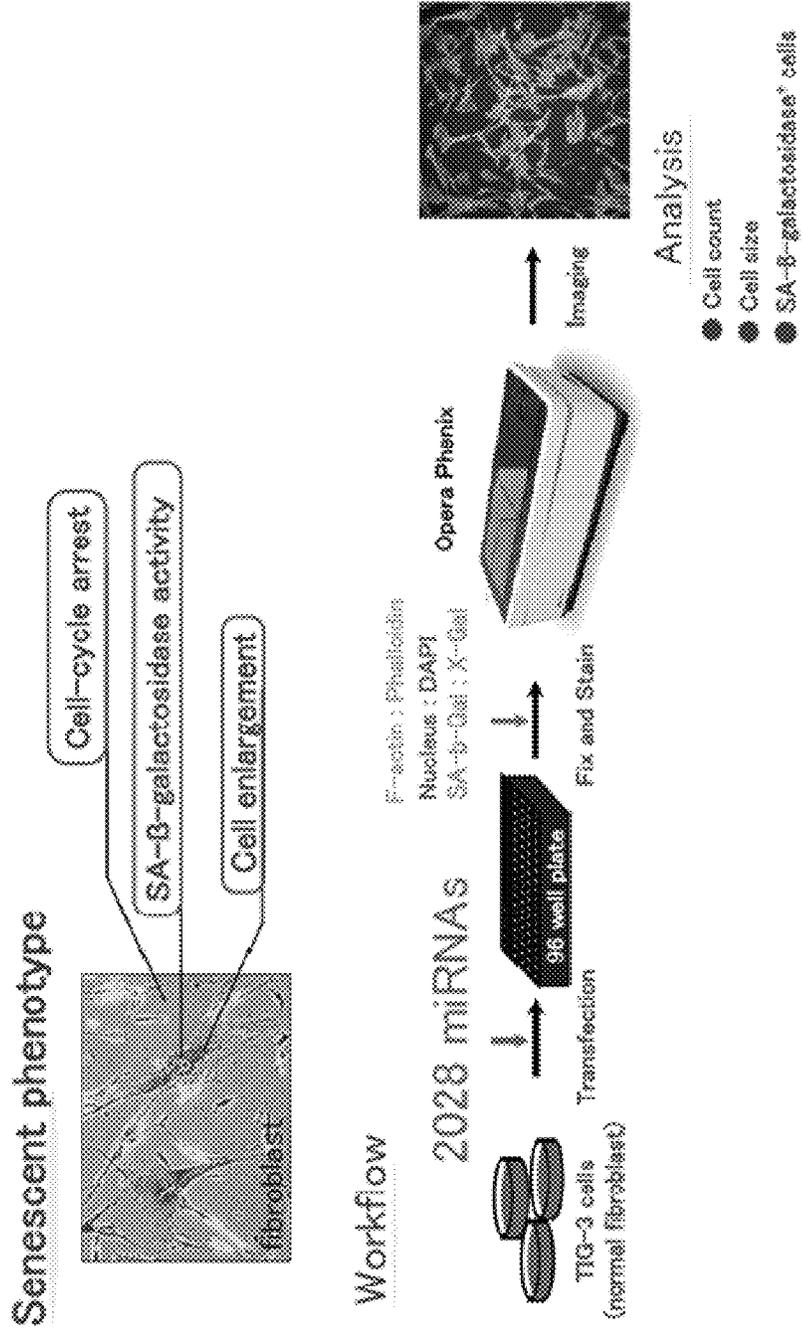High-content screening of senescence-inducible miRNAs

Cells : TIG-3 cells (Normal fibroblast)

$$\text{Relative score} = \frac{(\text{mirVana control}) - (\text{miR-X})}{(\text{mirVana control}) - (\text{miR-34a-5p})}$$

Senescence-Inducible miRNAs

579 miRNA (Candidates) → 349 miRNAs

miR-34a-5p

miR-22-5p
miR-22-3p

mirVana control

2

1

-1

small ← cell area → large

Relative score of cell area

more ← nucleus count → less

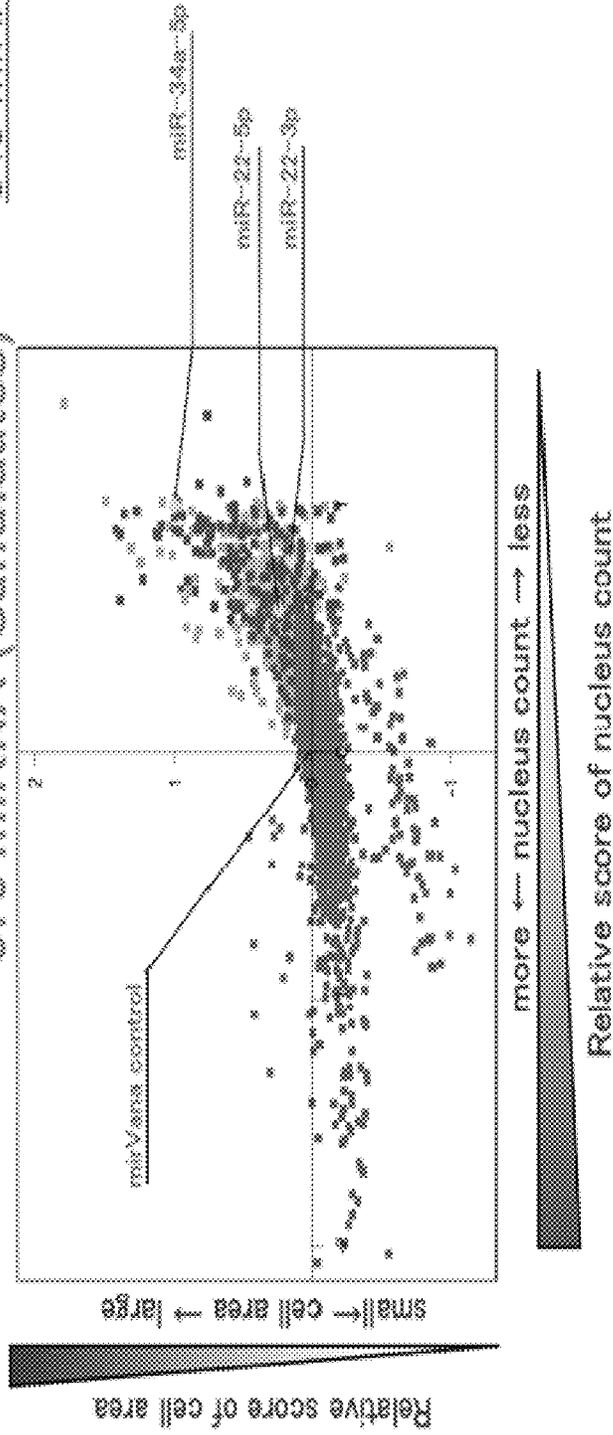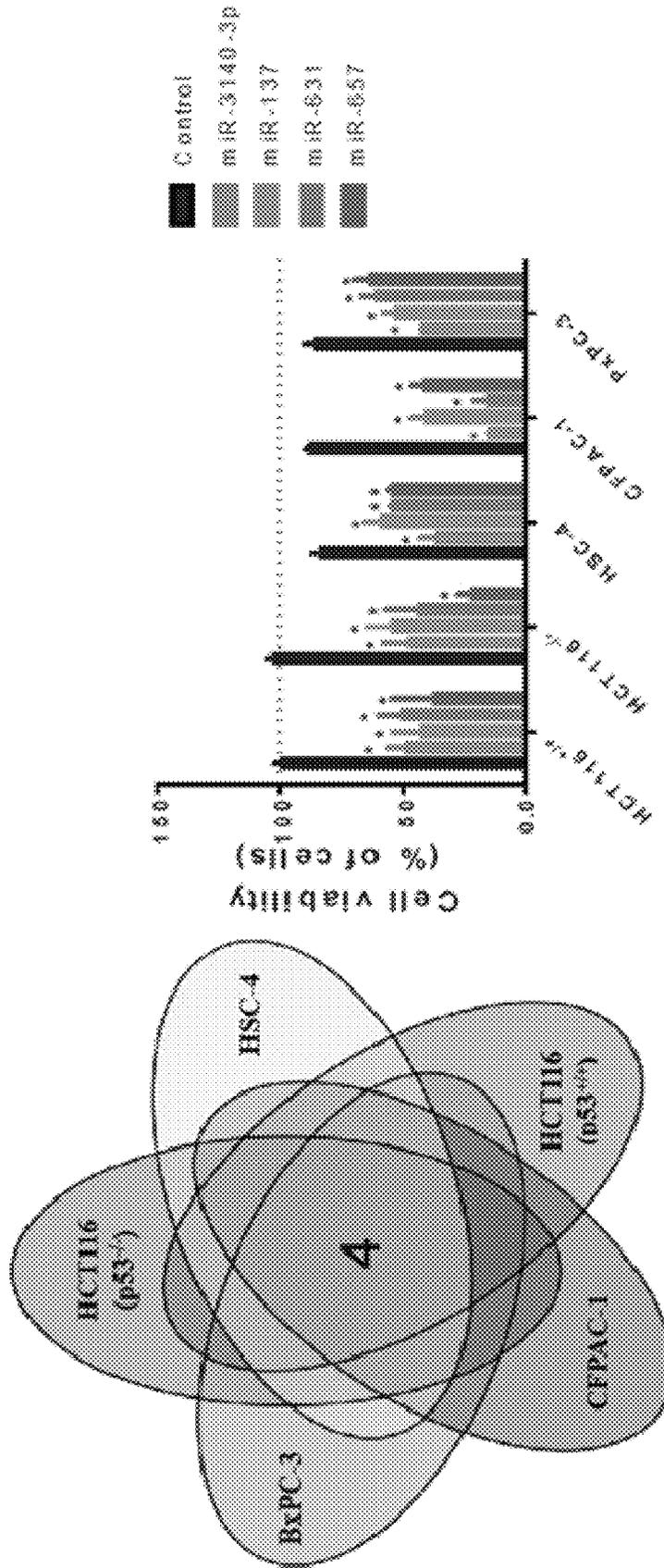Relative score of nucleus count

Fig. 3

Potent senescence-inducible miRNAs for cancer therapy

Fig. 4

Effect against tongue cancer cell strains
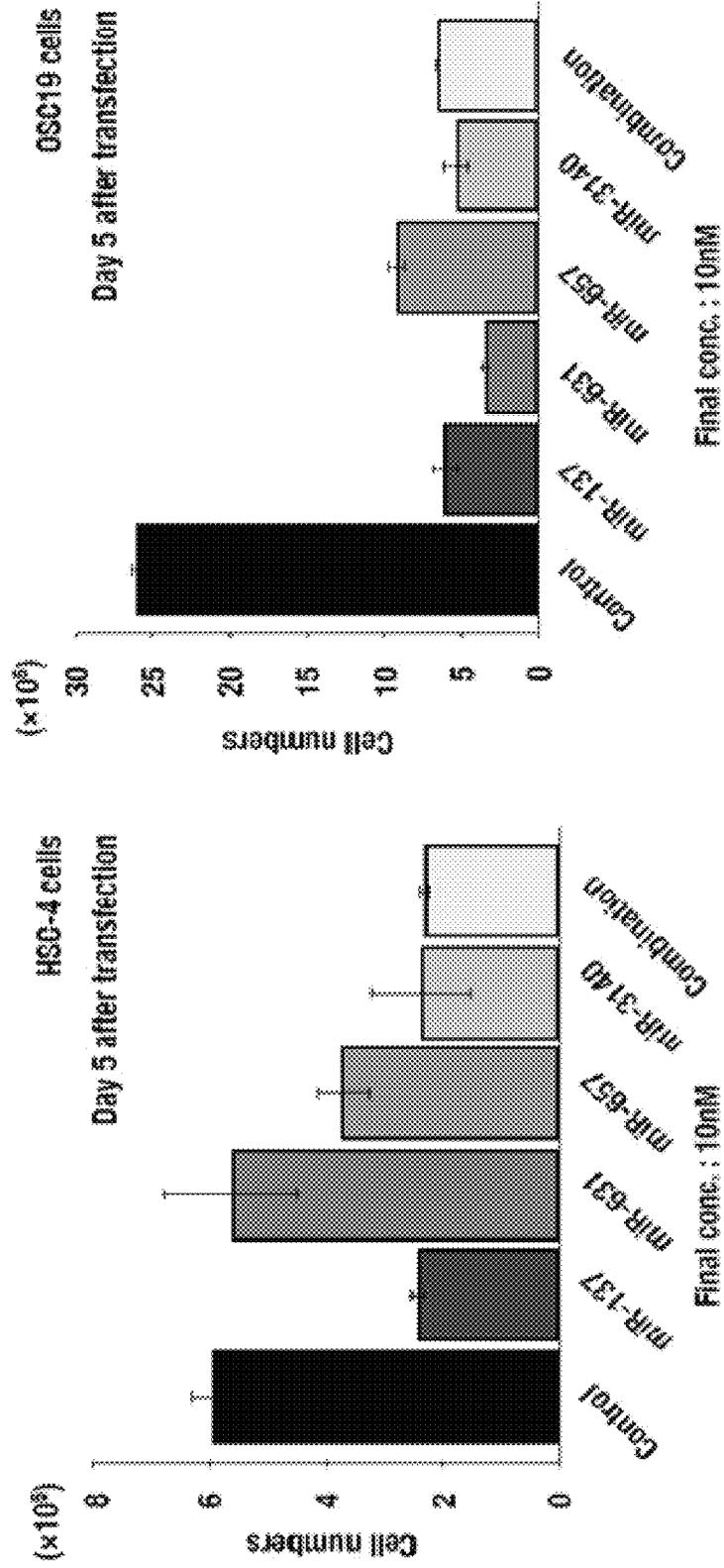
Fig. 5

Effect against tongue cancer cell strains

SAS cells

Day 7 after transfection
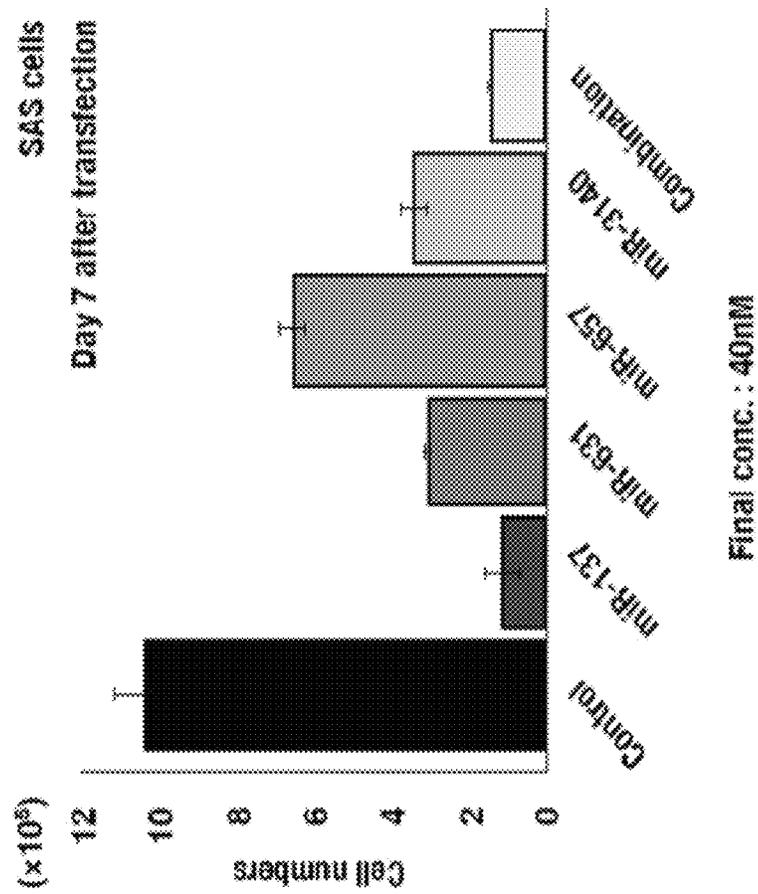
Final conc.: 40nM

Fig. 6
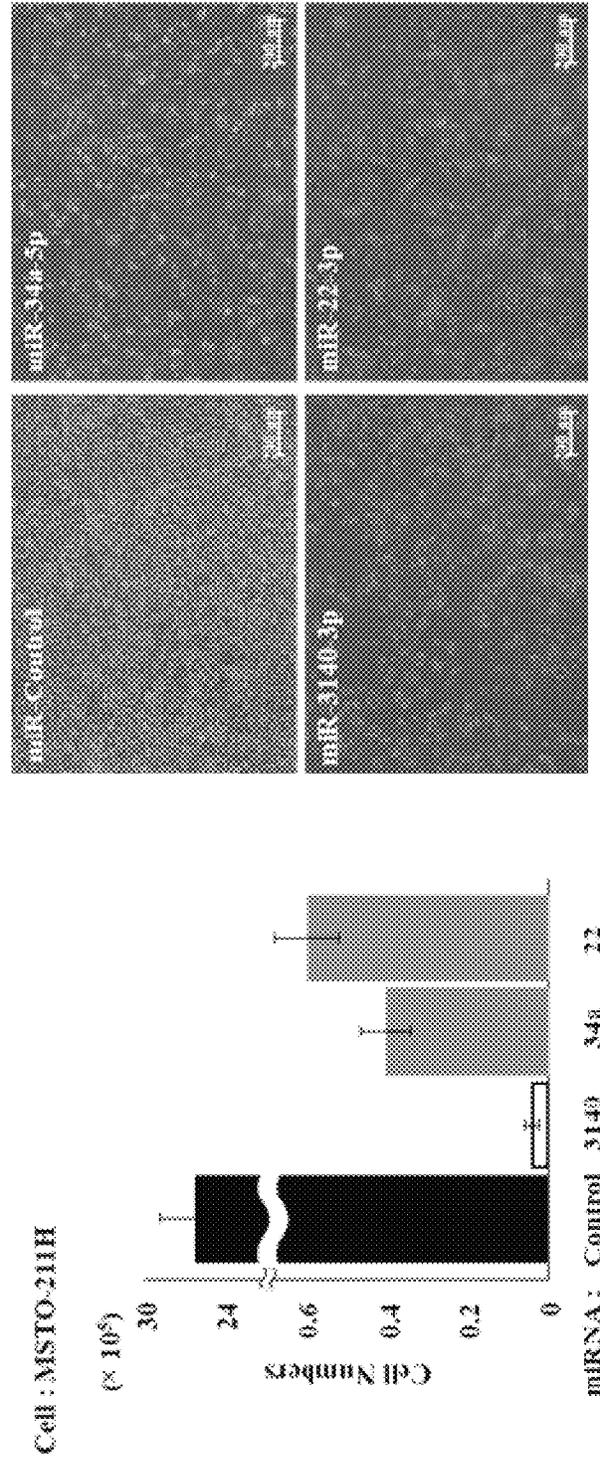

Effect against mesothelioma cell strains

Fig. 7

Effect against mesothelioma cell strains
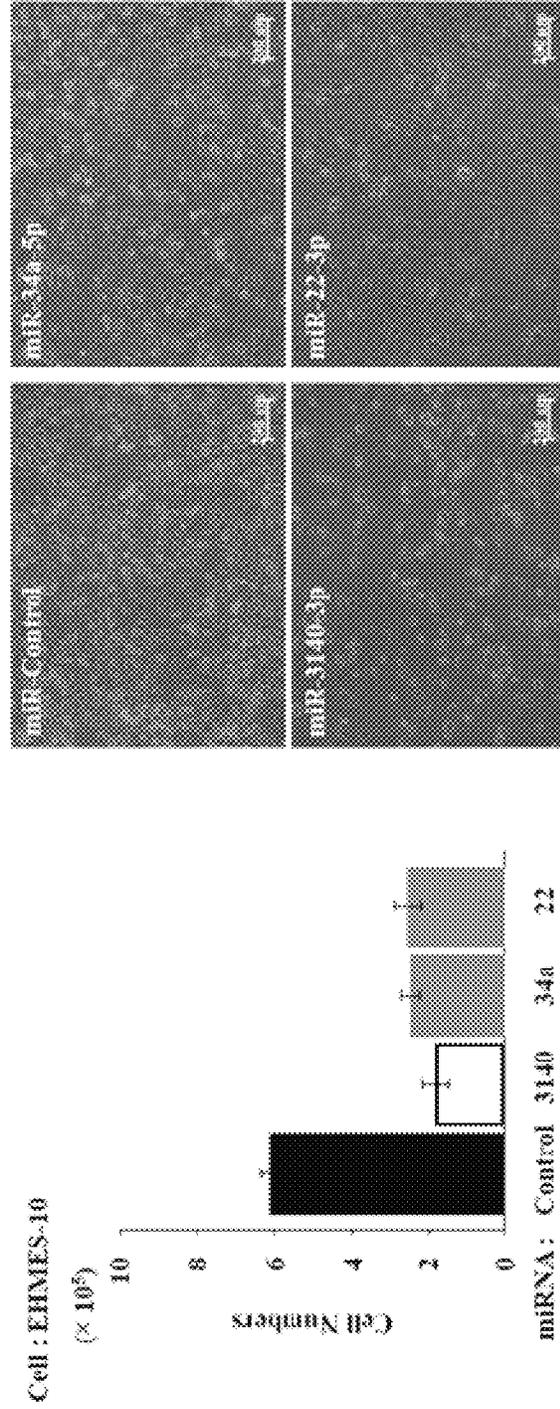
Fig. 8

Effect against uterine sarcoma cell strains

Cells : MES-SA
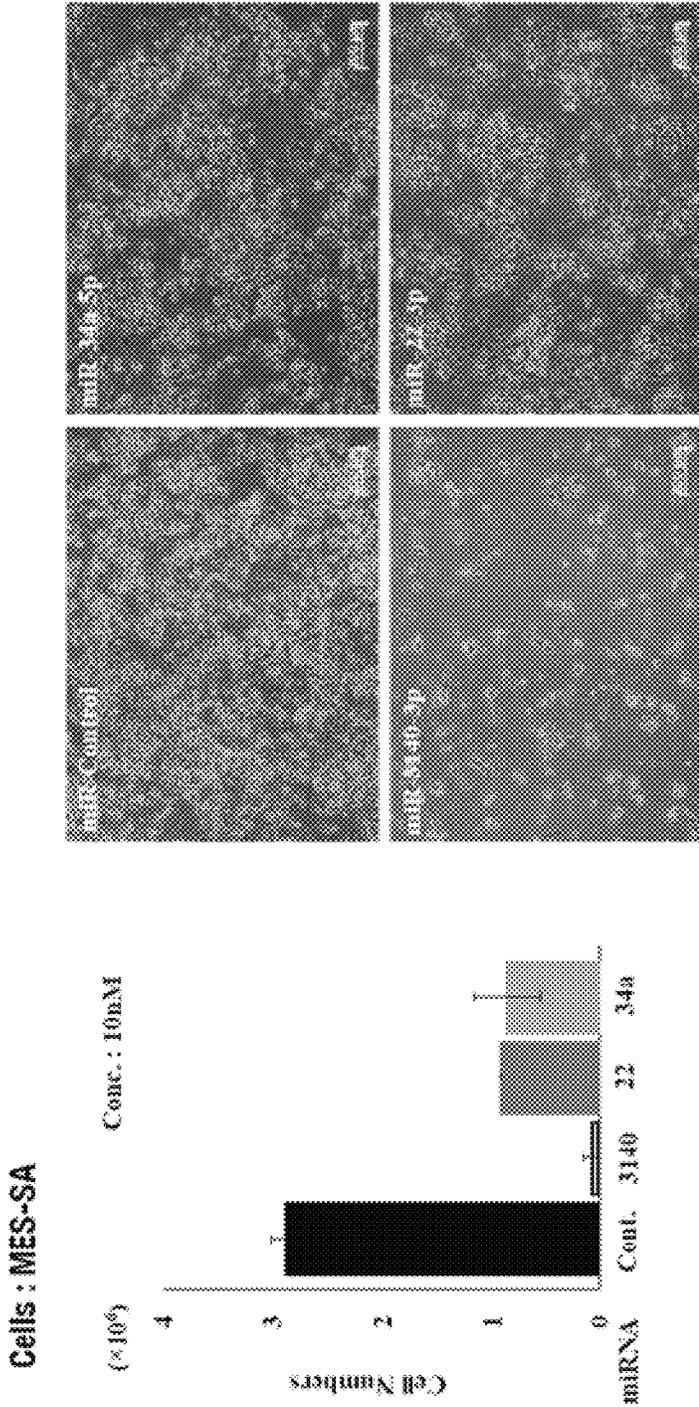
Fig. 9

Effect against osteosarcoma cell strains
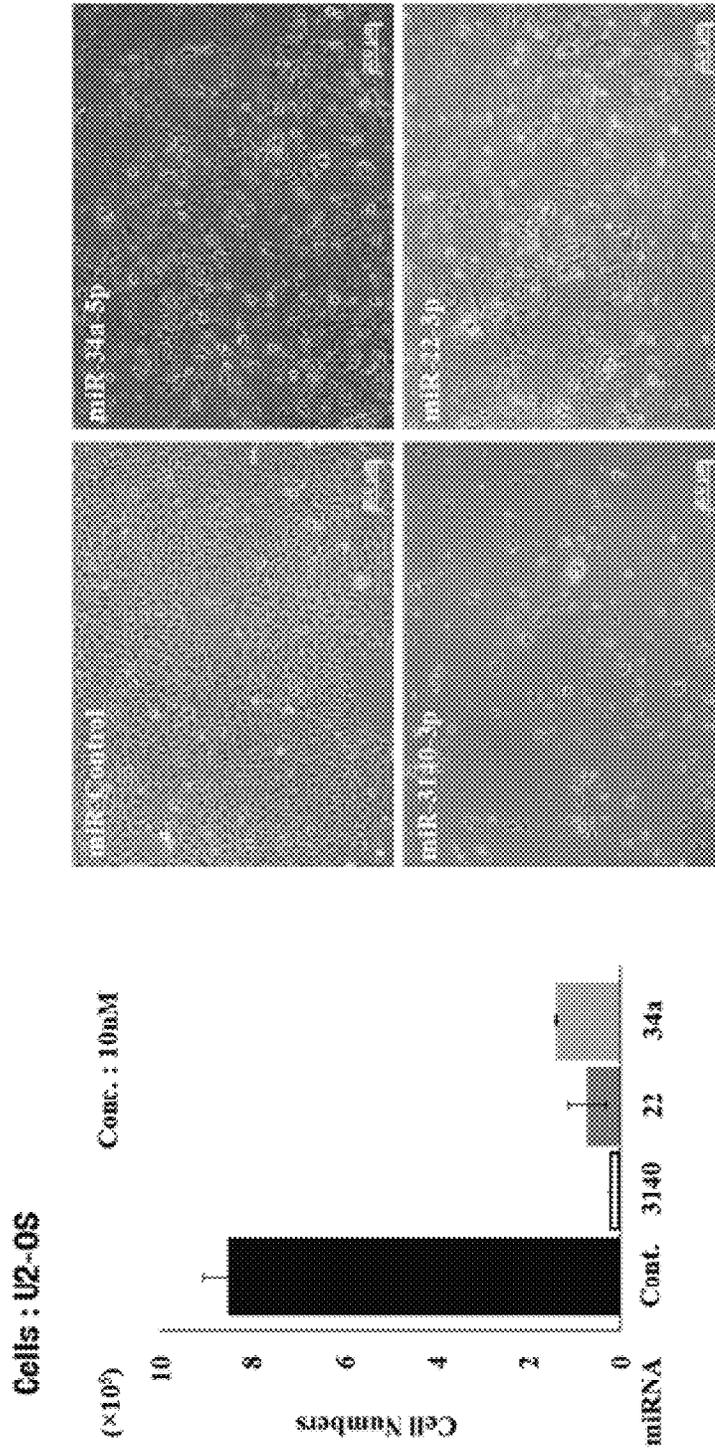
Fig. 10

miR-3140-3p SIGNIFICANTLY INDUCE APOPTOSIS ON CANCER STEM CELLS
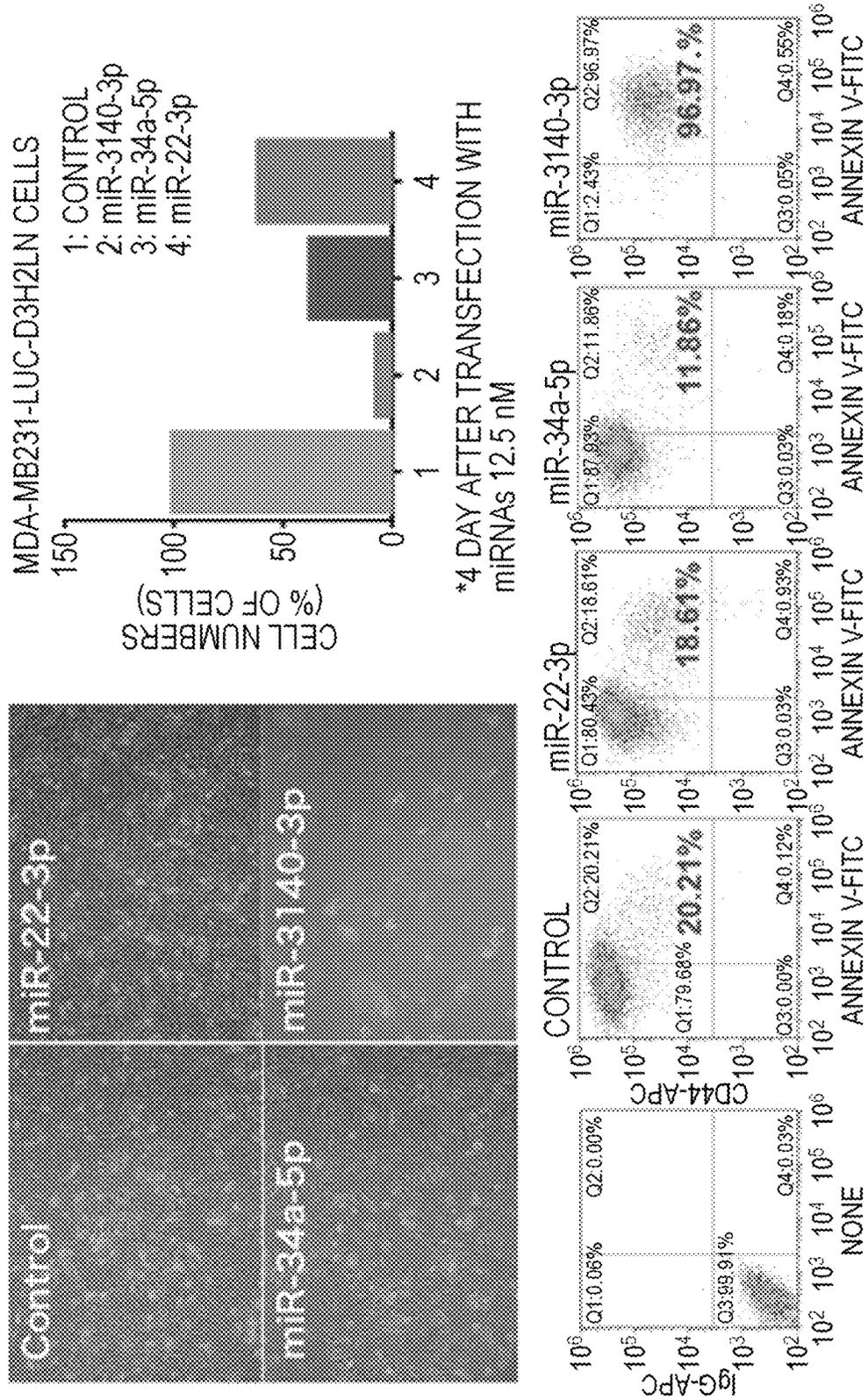
Fig. 11

Effect against lung cancer strains

Fig. 12

Effect against large intestine cancer cells
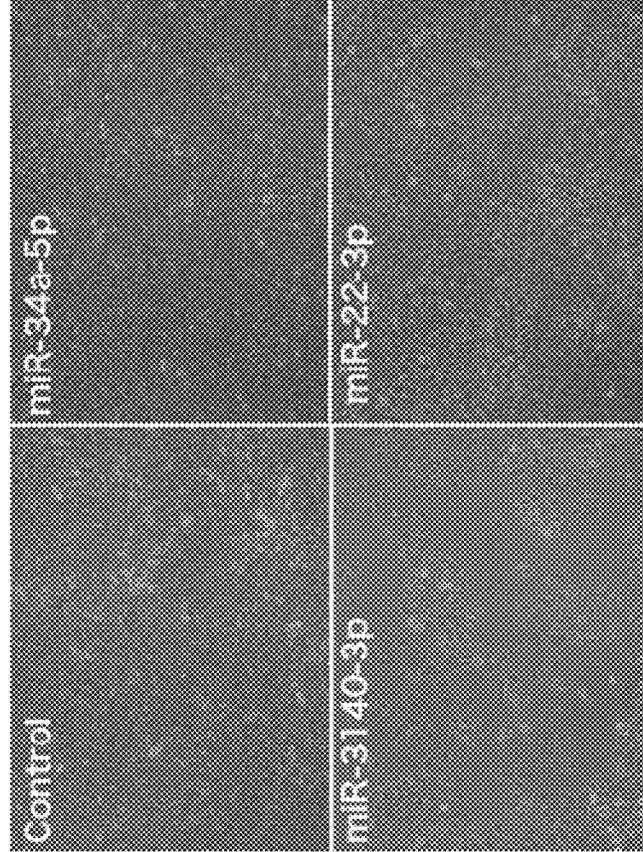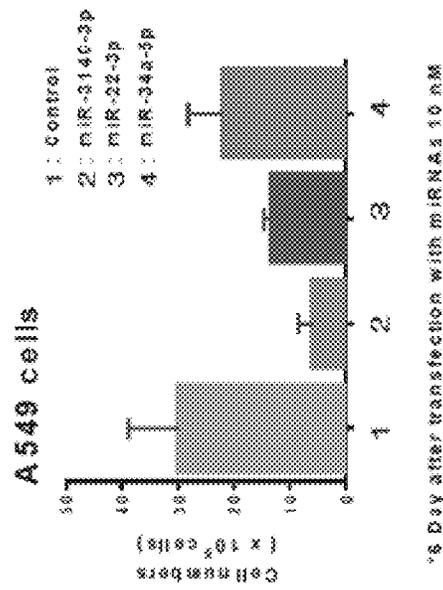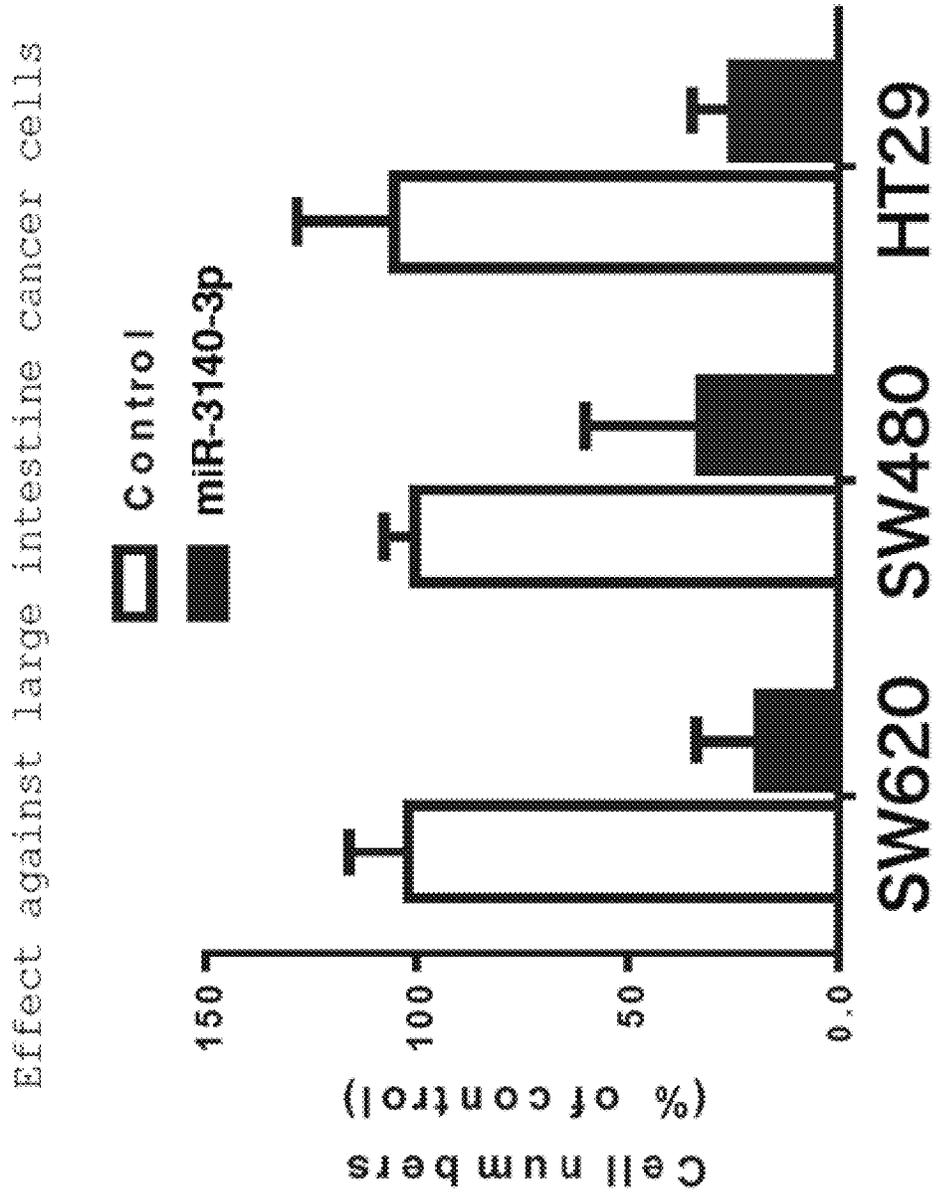
Fig. 13

Antitumor effect of miR-3140-3p in
subcutaneous transplantation of malignant
pleural mesothelioma cancer cells

Fig. 14
CHANGE IN TUMOR PROLIFERATION WHEN ADMINISTERING miR-3140 (IMAGING)
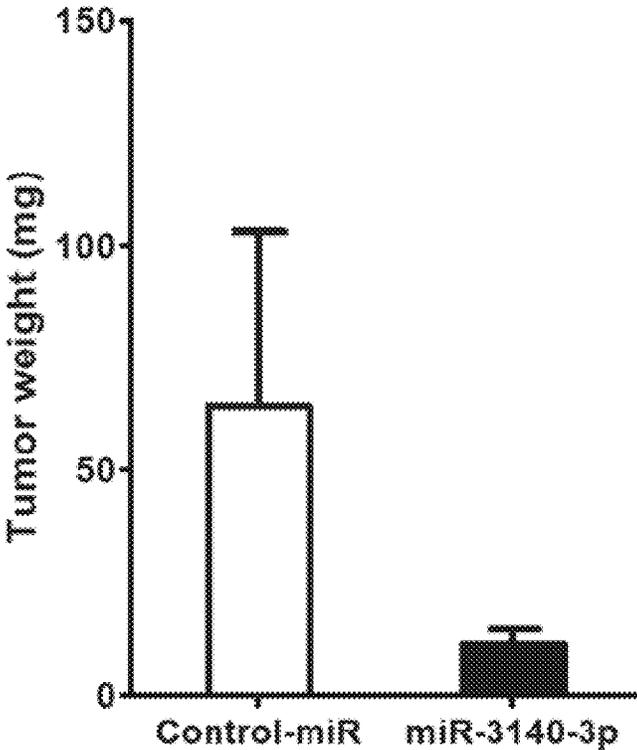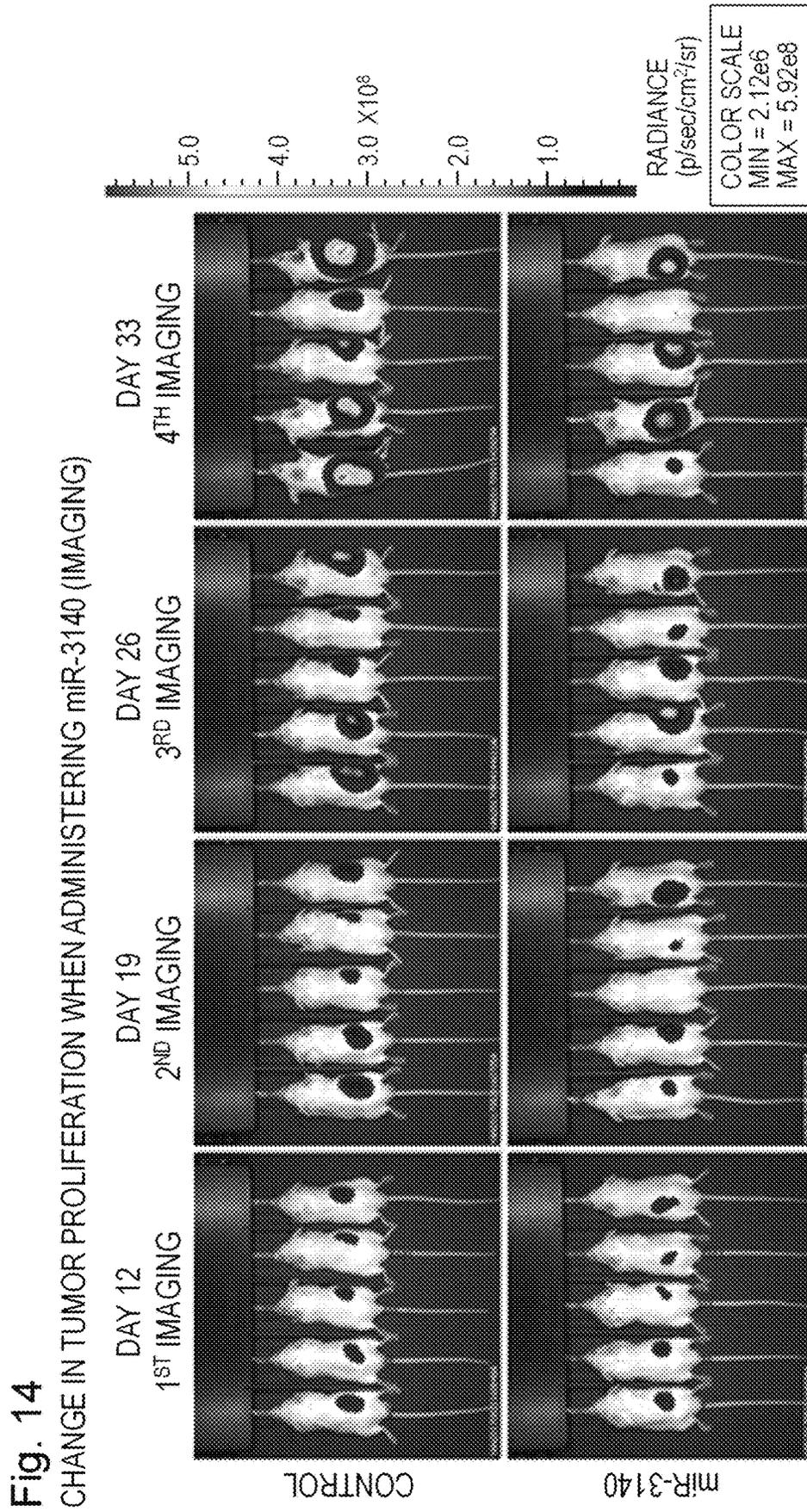
Fig. 15

Change in tumor proliferation when
administering miR-3140

○ : Control

● : miR-3140

Fig. 16

Change in tumor weight when administering miR-3140
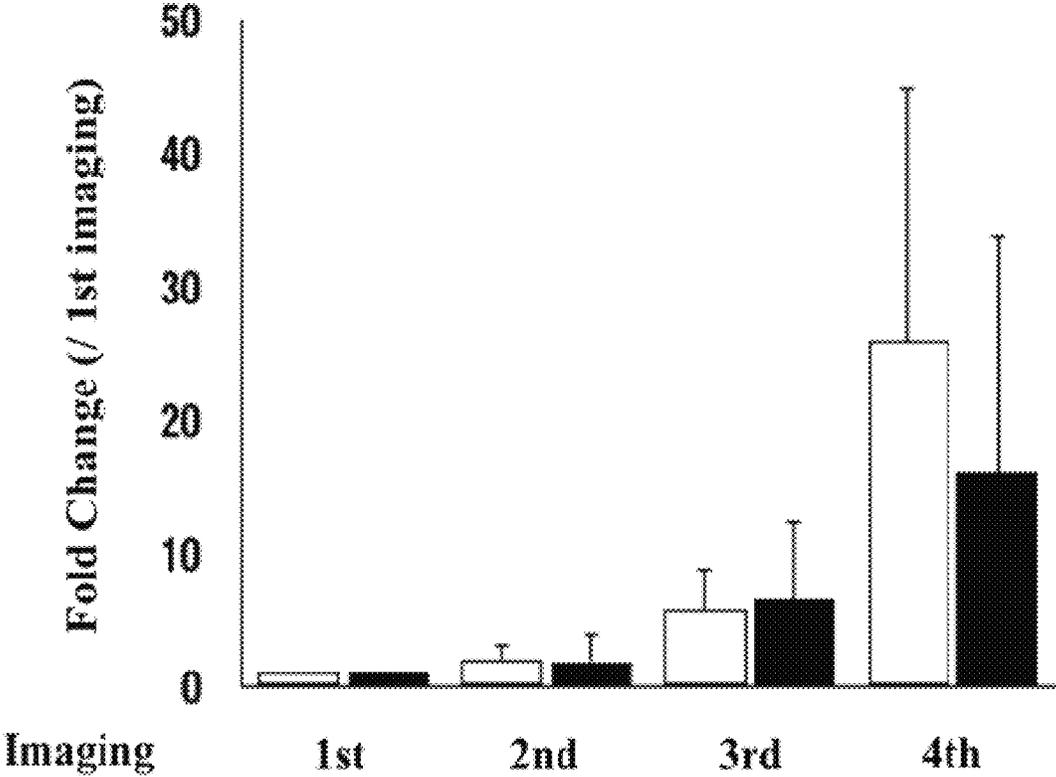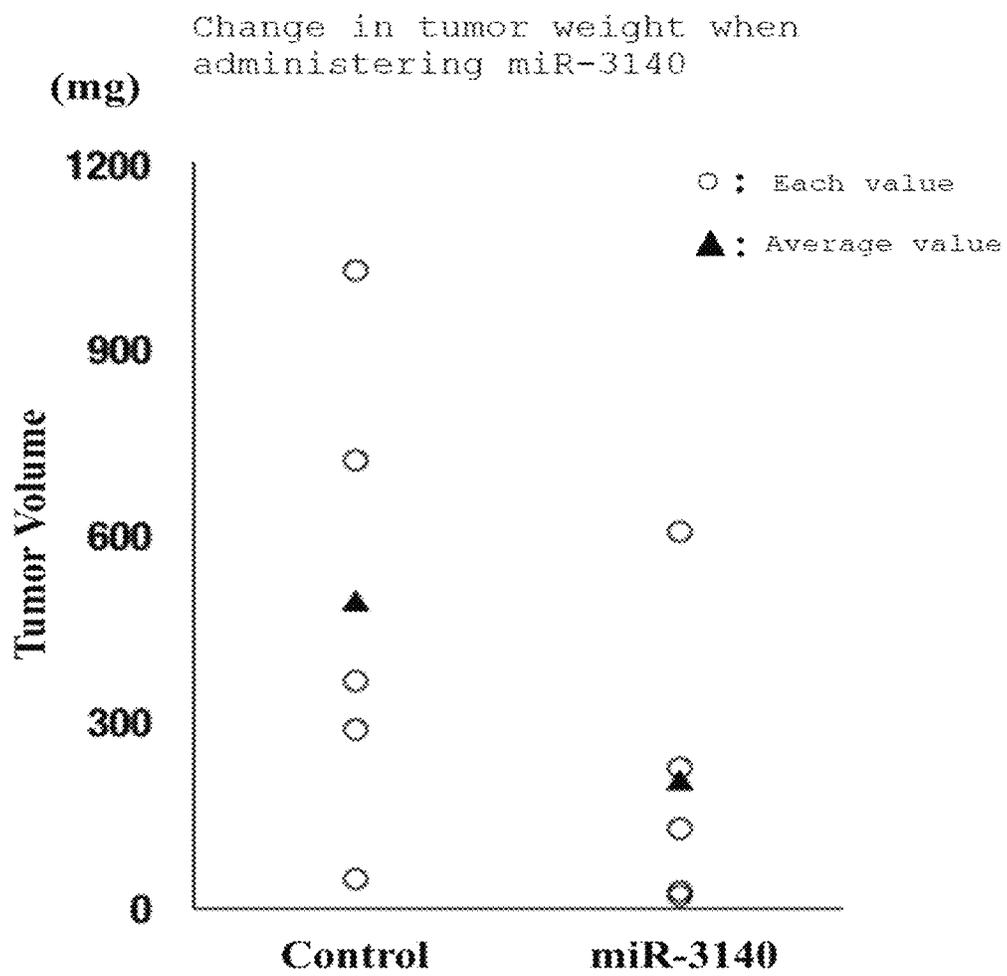
Fig. 17

CHANGE IN TUMOR PROLIFERATION WHEN ADMINISTERING miRNA
(IMAGING AT ENDPOINT)
TRANSPLANTED CELL: HSC-4 (TONGUE CANCER CELL)
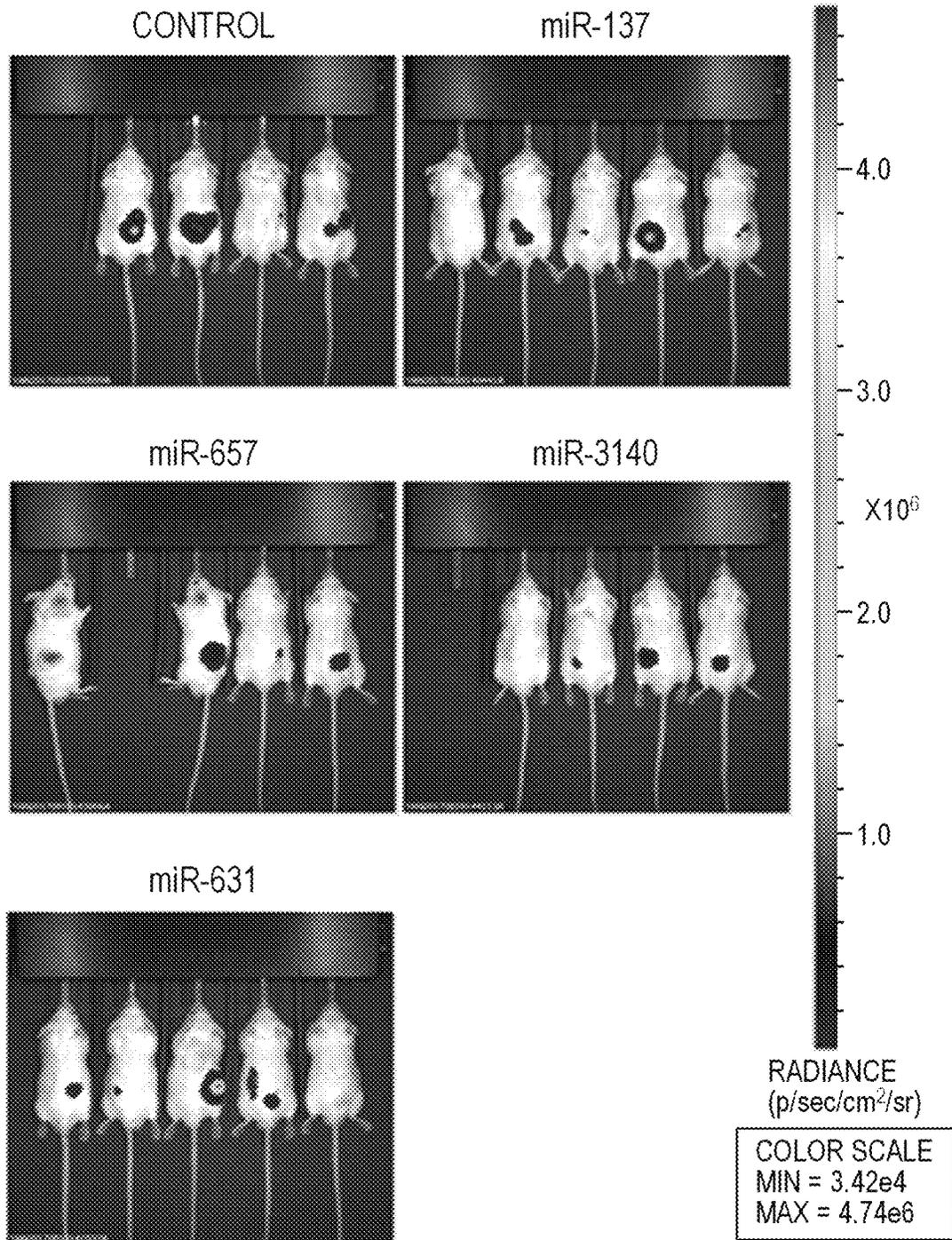
Fig. 18

Change in tumor weight when administering miRNA
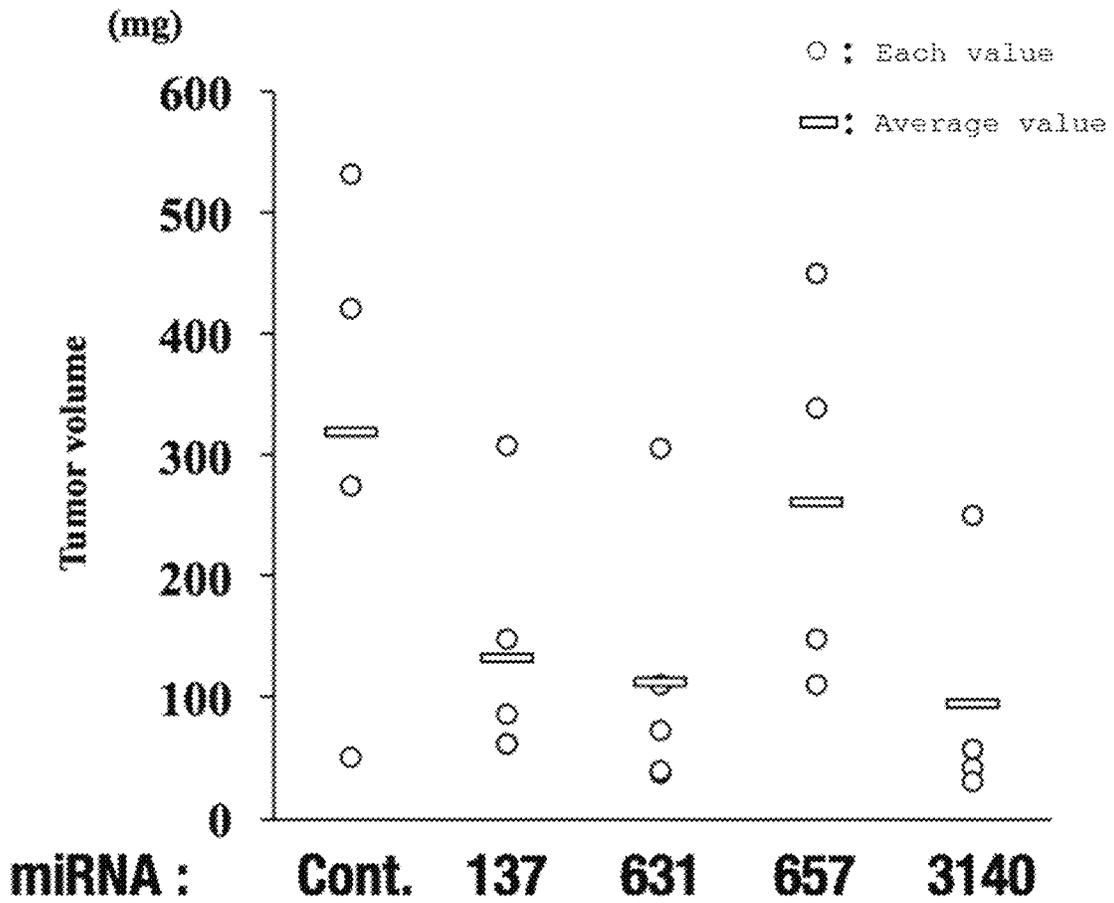
Fig. 19
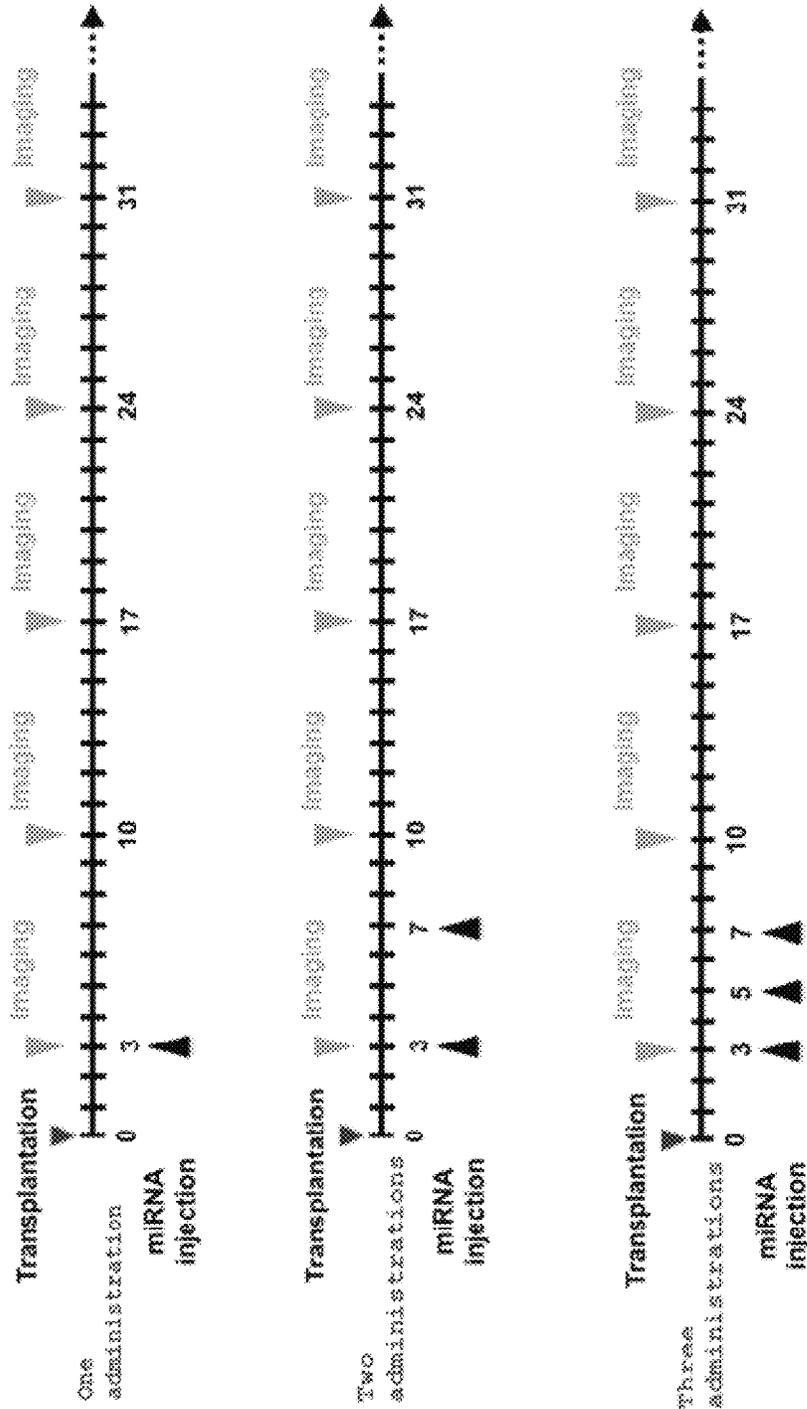
Fig. 20

IMAGING RESULTS WHEN miR-3140-3p IS ADMINISTERED ONCE
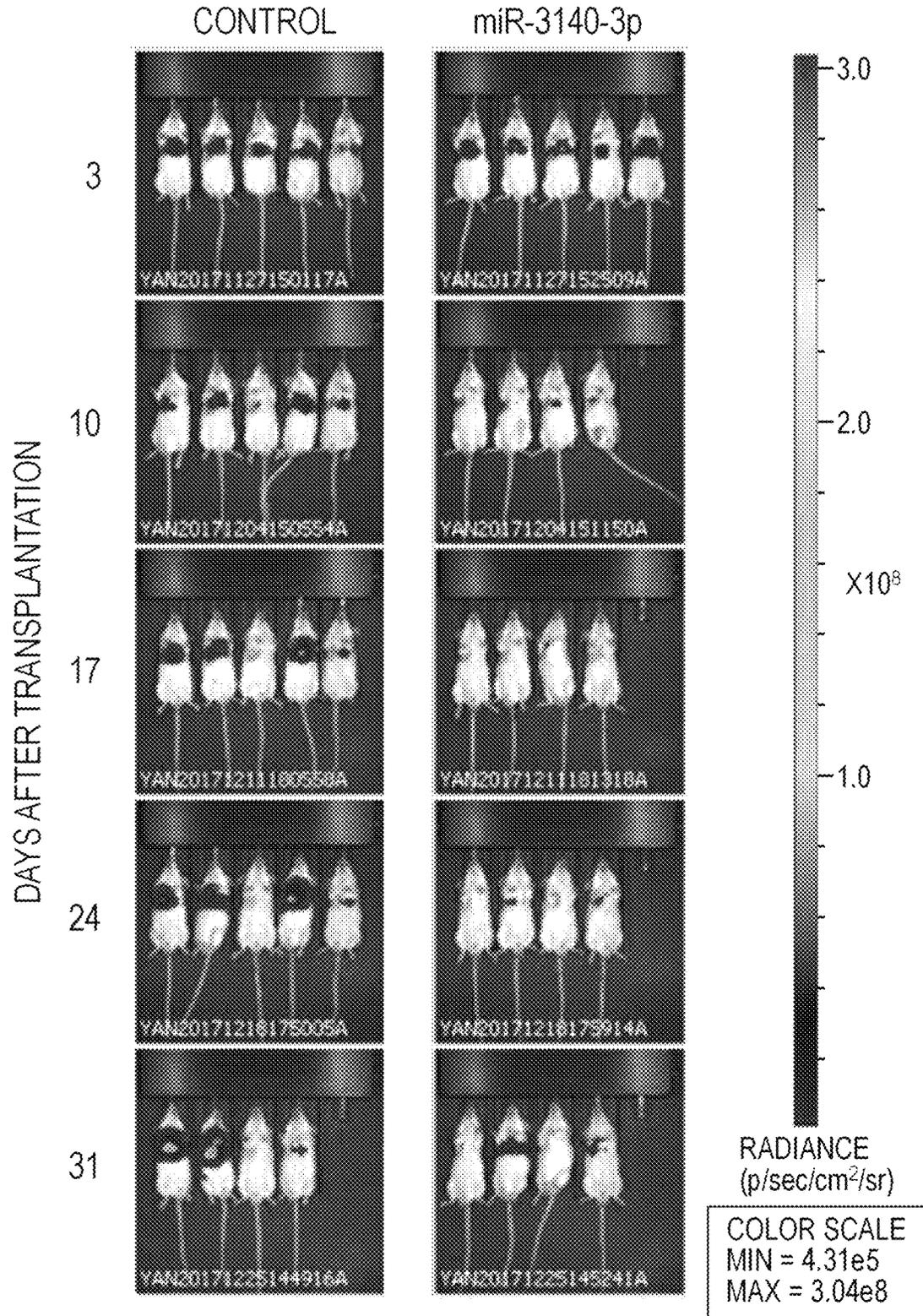
Fig. 21

Imaging results when miR-3140-3p is administered once

Fig. 22

Mouse survival rates when miR-3140-3p is administered once
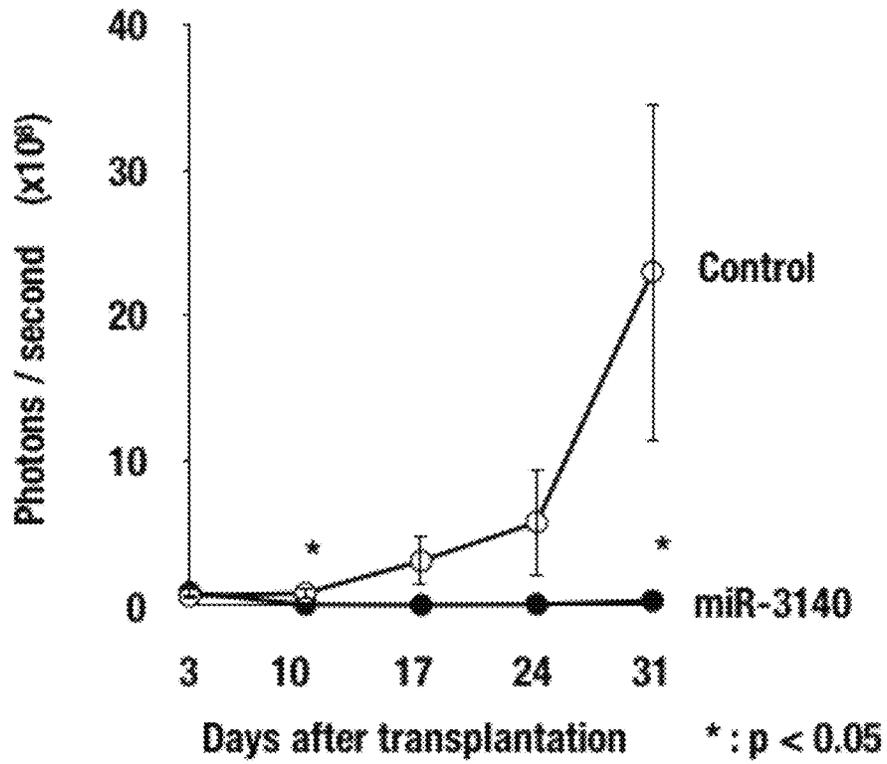
Fig. 23

IMAGING RESULTS WHEN miR-3140-3p IS ADMINISTERED TWICE
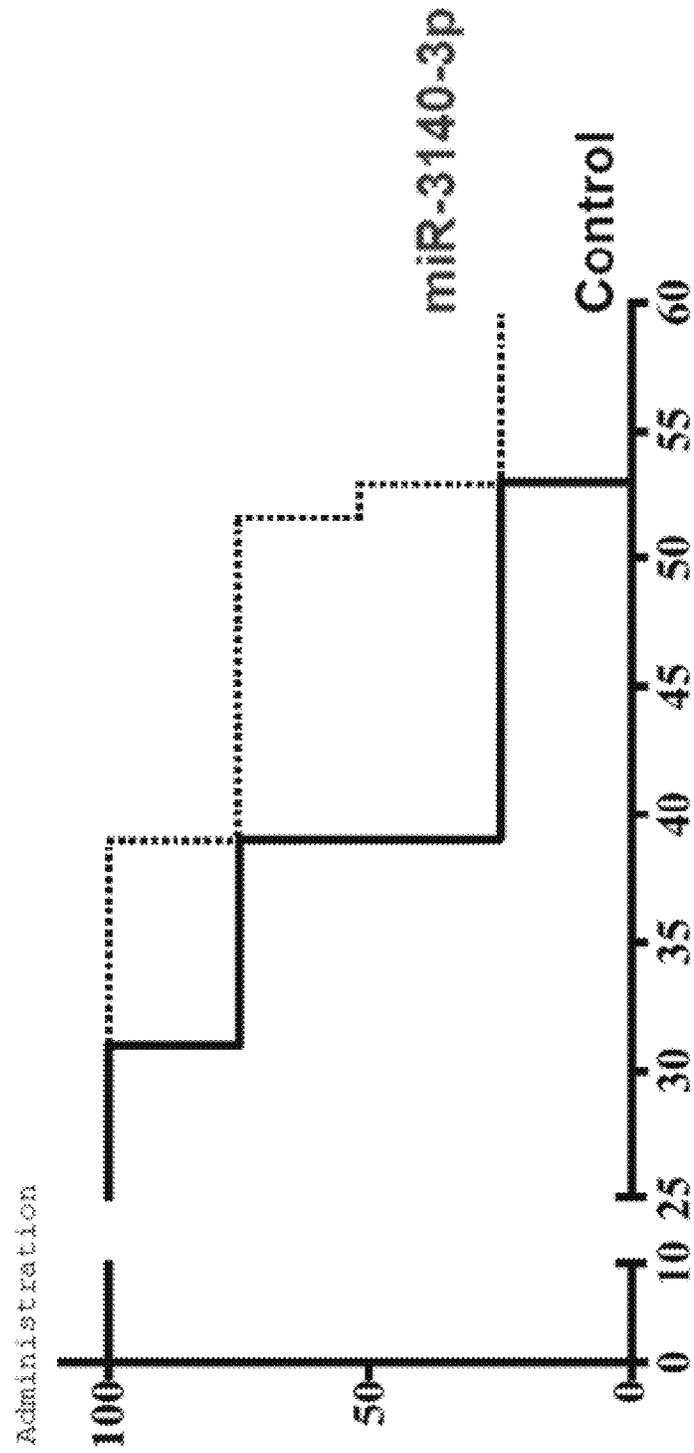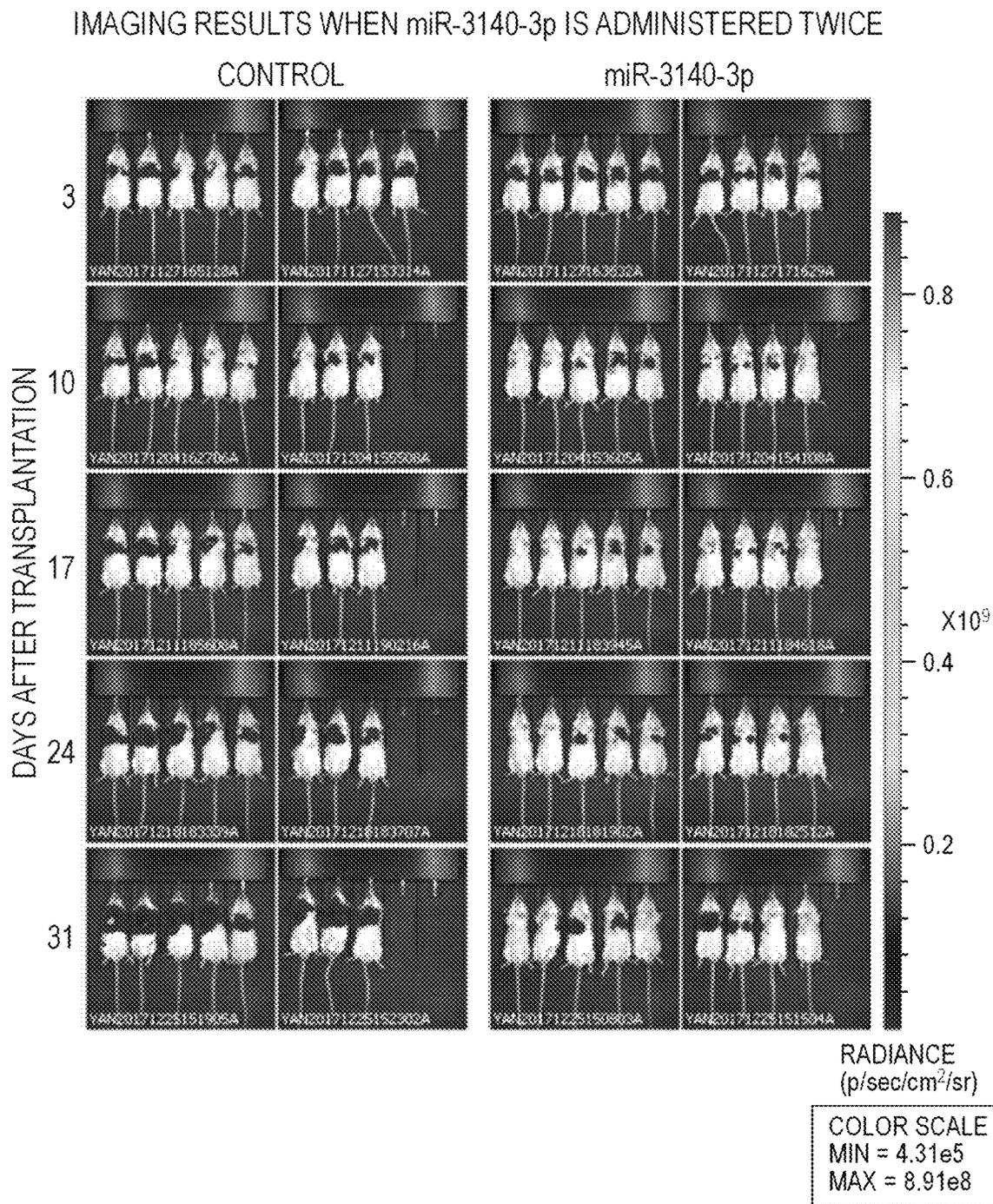
Fig. 24

Imaging results when miR-3140-3p is administered twice

Fig. 25

Mouse survival rates when miR-3140-3p is administered twice

Two administrations

miR-3140-3p

Control

Percent survival

100

50

0

Days after transplantation

0 10 25 30 35 40 45 50 55 60
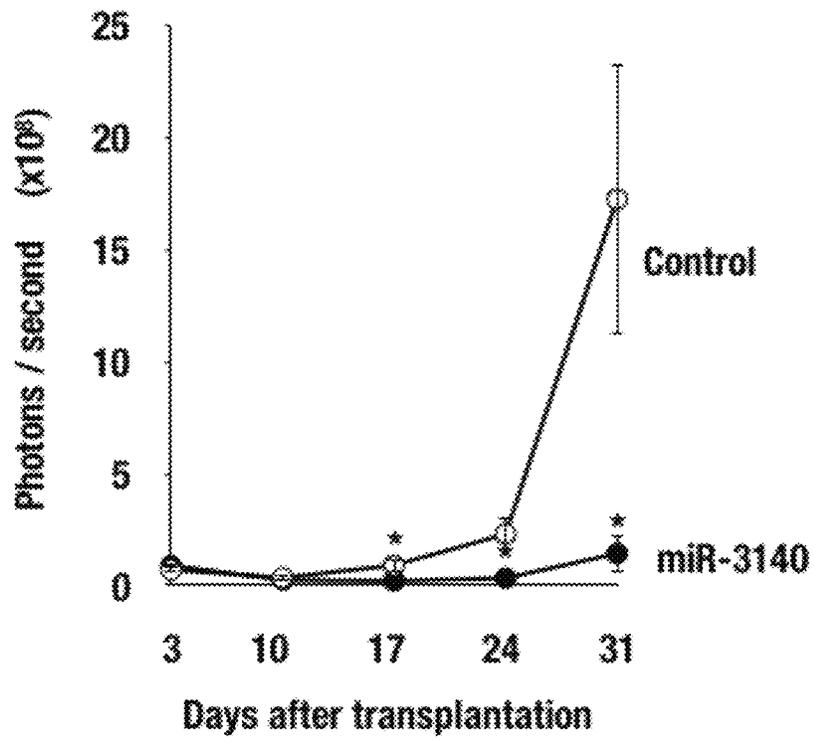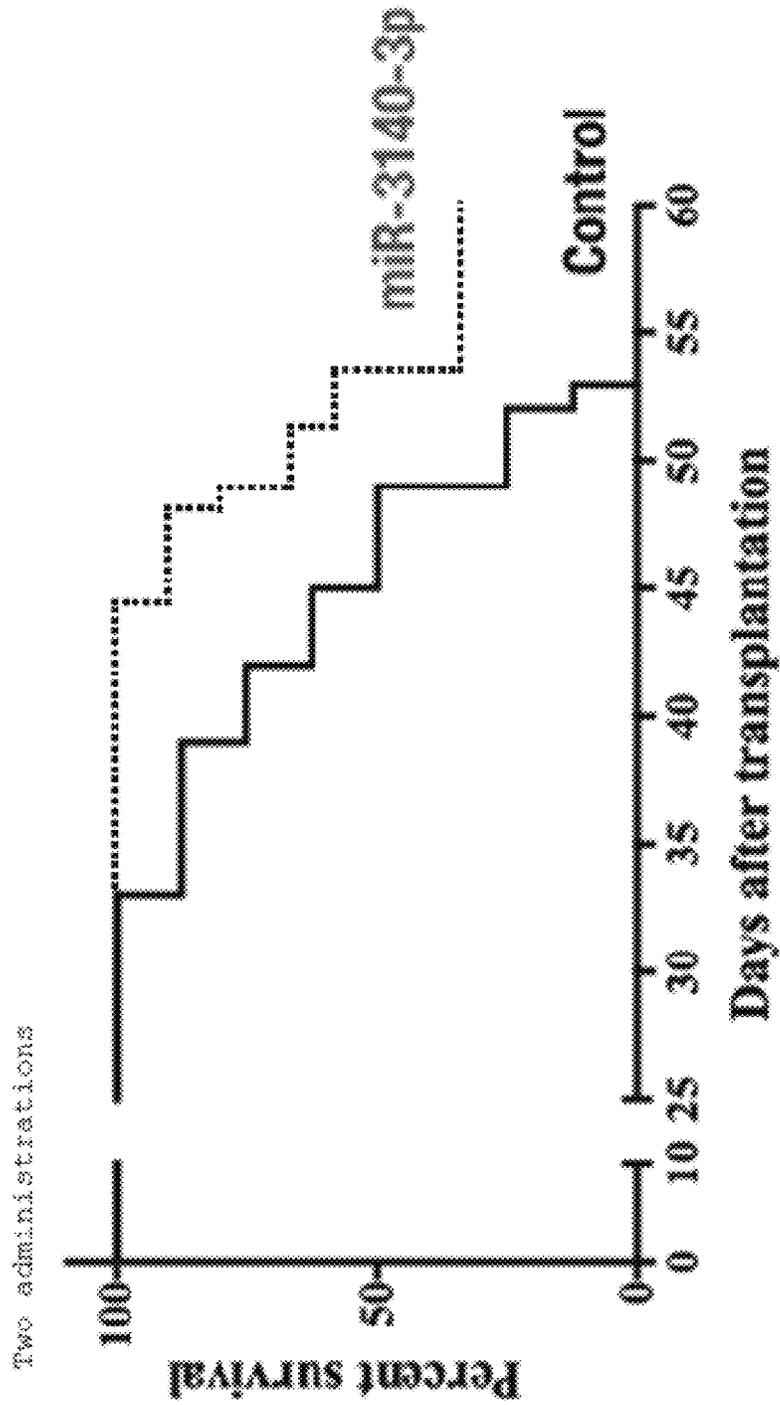
Fig. 26

IMAGING RESULTS WHEN miR-3140-3p IS ADMINISTERED THREE TIMES
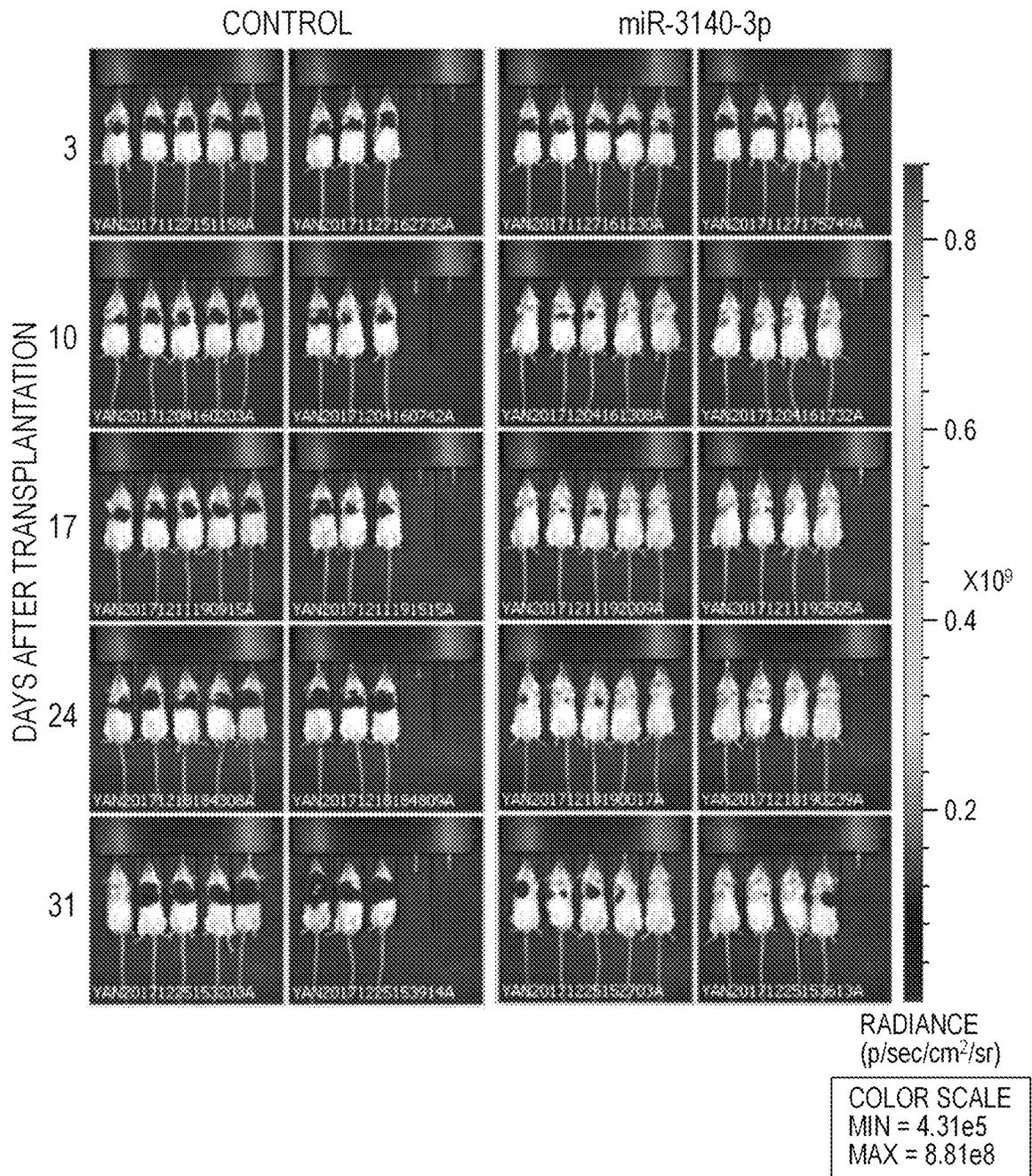
Fig. 27

Imaging results when miR-3140-3p is administered three times
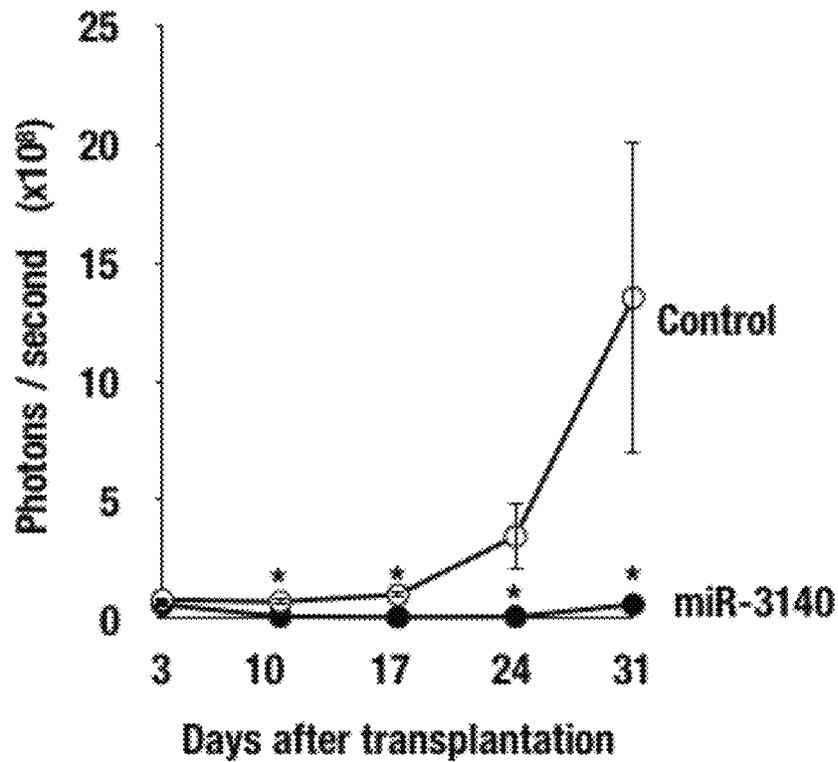
Fig. 28

Imaging results when miR-3140-3p is administered three times

three administrations

miR-3140-3p

Control

Percent survival

Days after transplantation
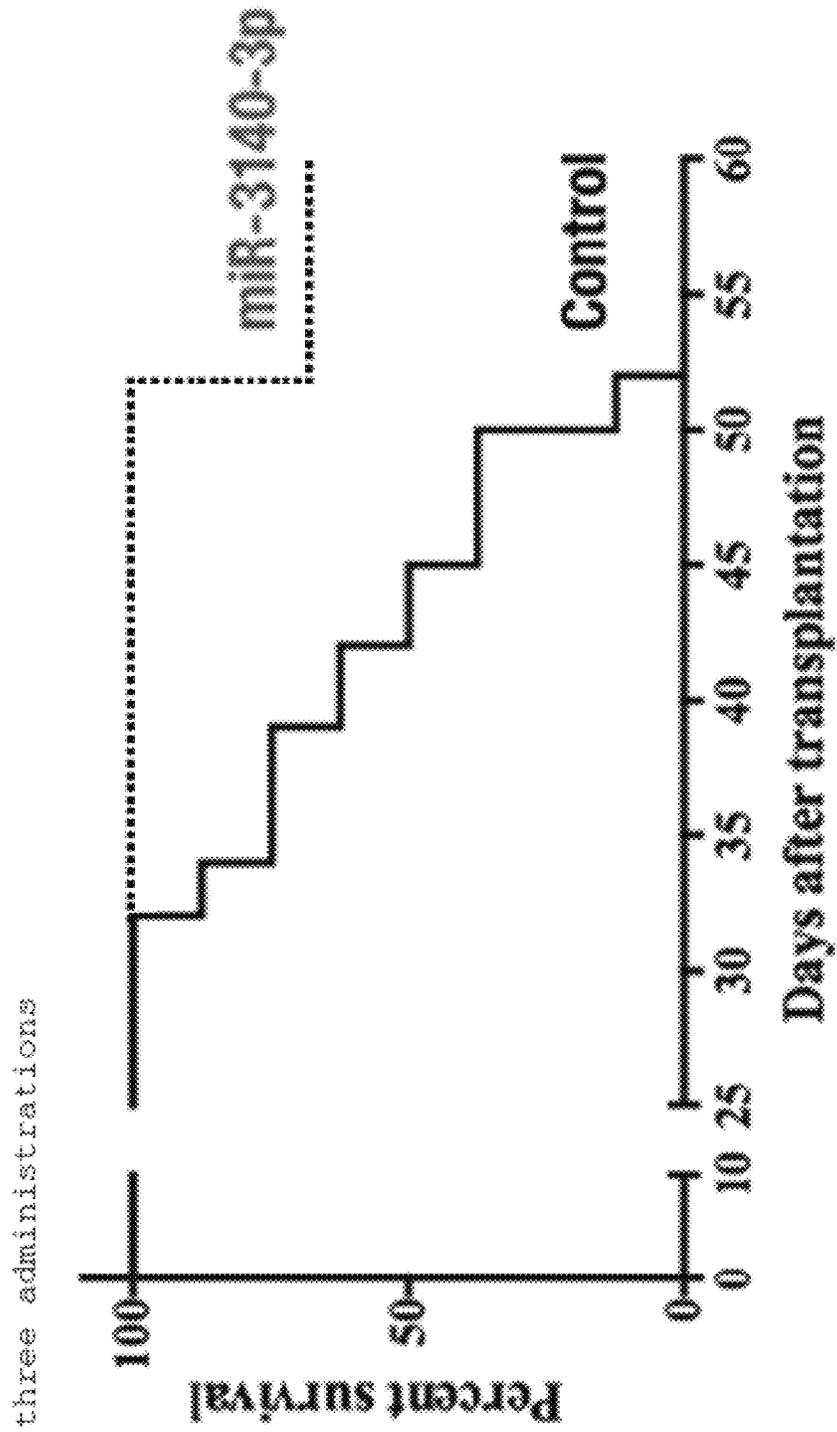
Fig. 29
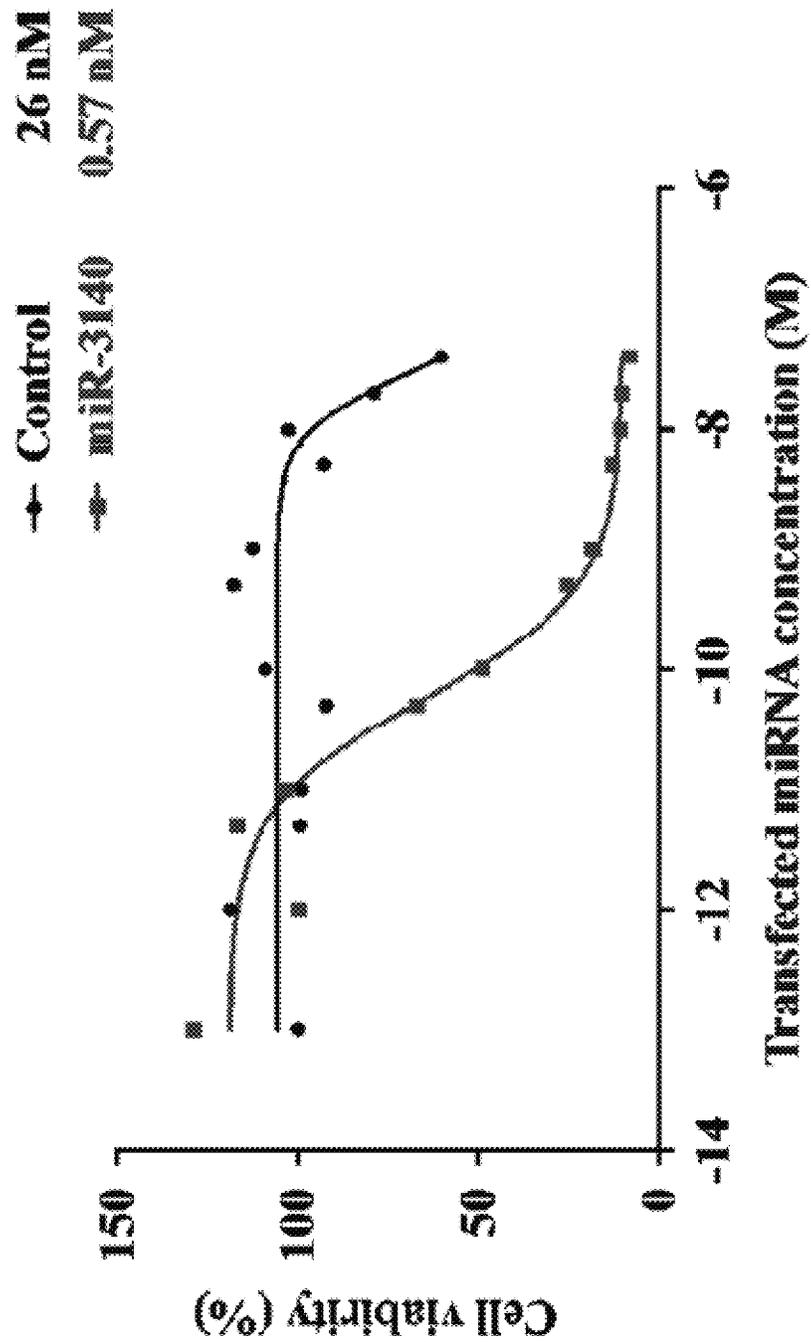
Fig. 30

COMPARISON OF EFFECT BETWEEN miR-3140-3p AND CISPLATIN

Fig. 31

COMPARISON OF EFFECT BETWEEN miR-3140-3p AND CISPLATIN
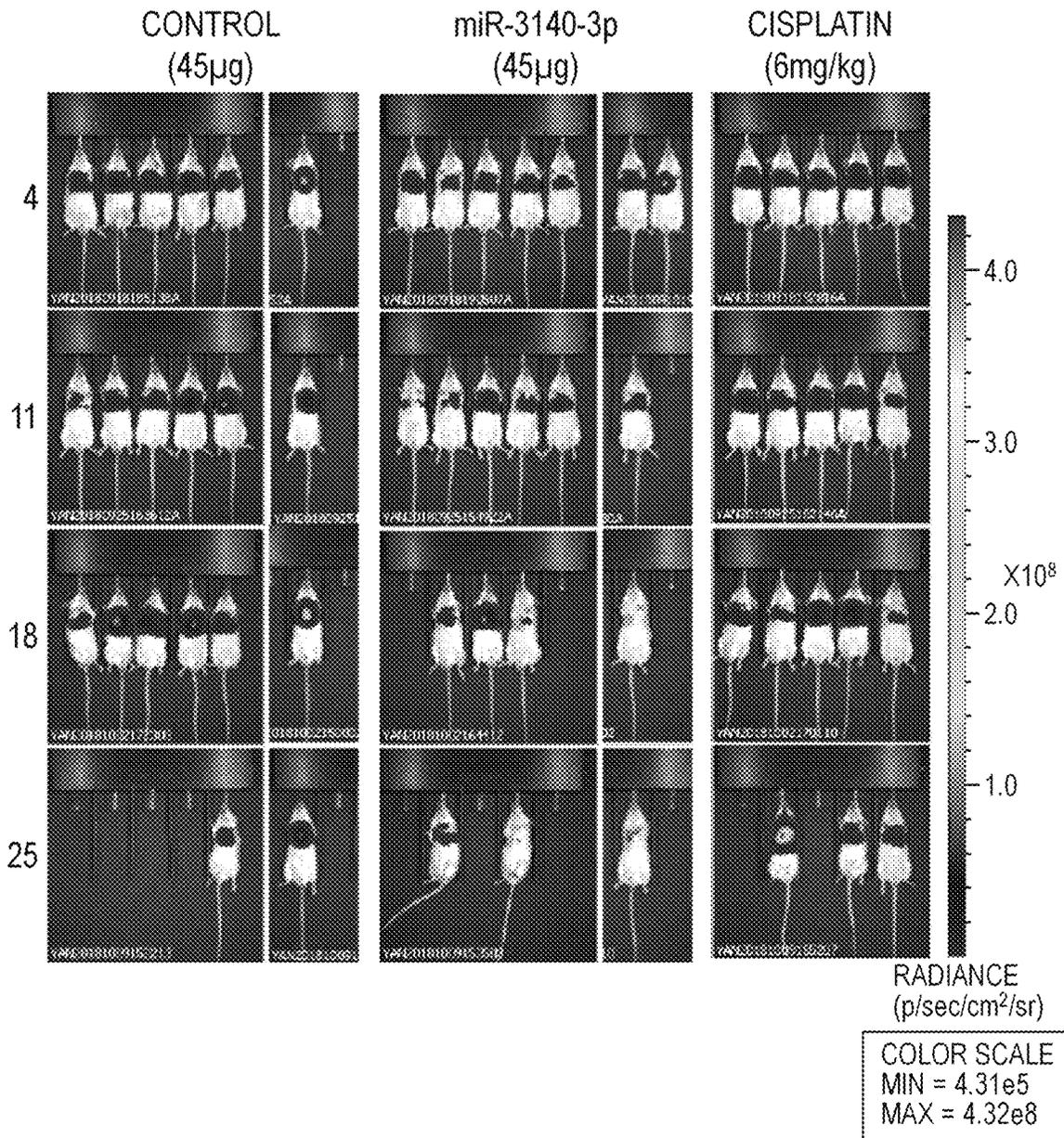
Fig. 32

Comparison of effect between
miR-3140-3p and Cisplatin
Tumor imaging result
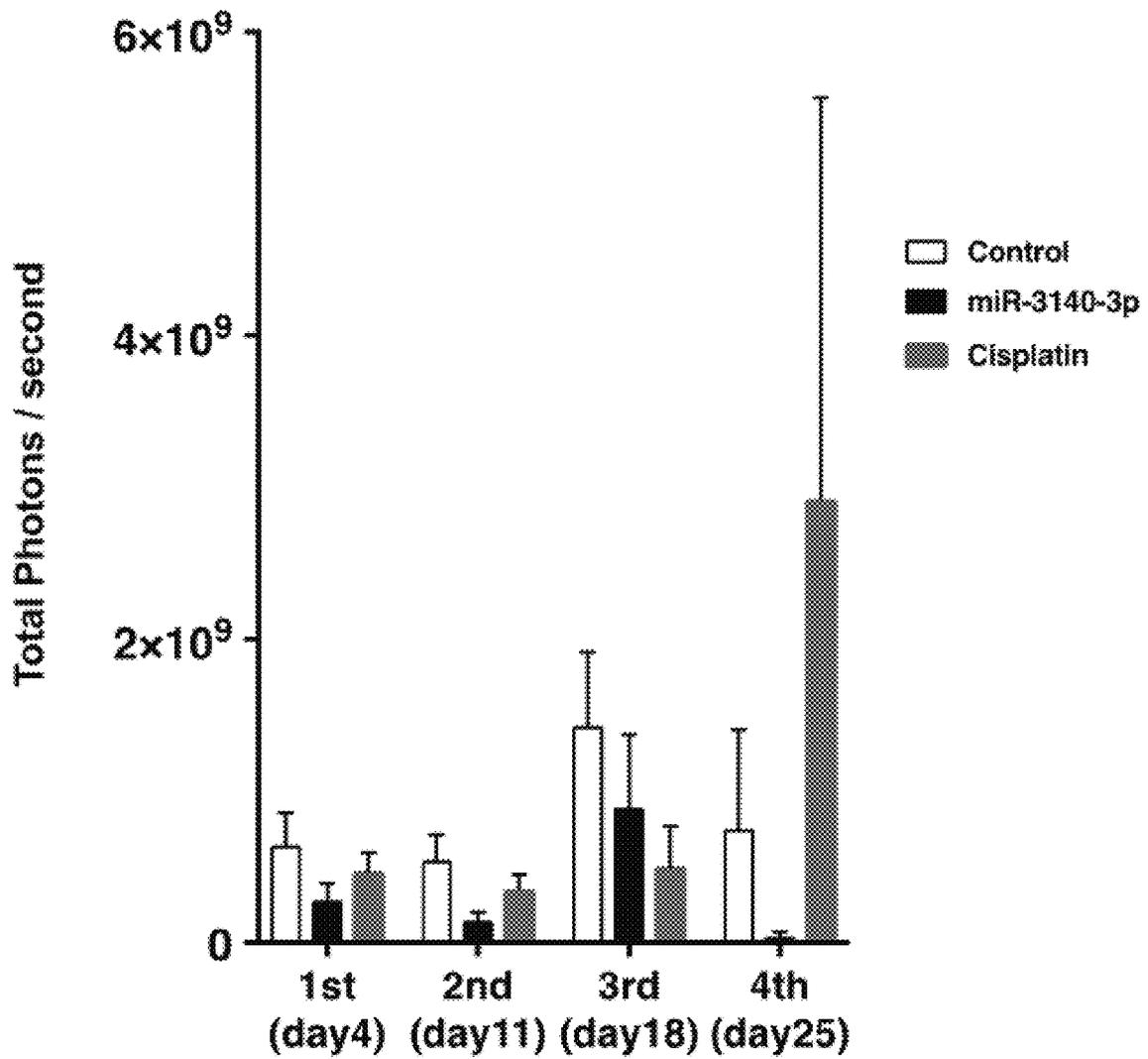
Fig. 33

Comparison of effect between miR-3140-3p and Cisplatin

Survival rates of mice at three weeks after administration
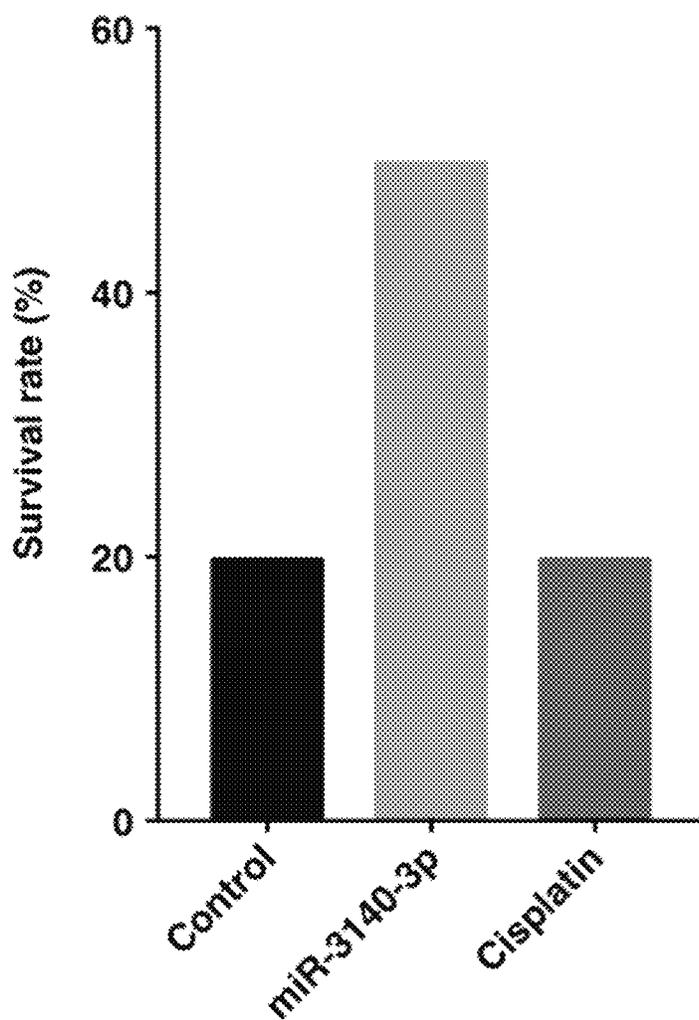
THERAPEUTIC PHARMACEUTICAL COMPOSITION FOR CANCER INCLUDING miRNA

TECHNICAL FIELD

The present invention relates to a pharmaceutical composition for cancer therapy comprising a transcription or processing product of a gene encoding a particular miRNA.

BACKGROUND ART

MicroRNA (hereinafter miRNA) is a functional nucleic acid that is encoded on the genome and ultimately becomes a minuscule RNA of about 20-25 bases long through a multistep production process. miRNA is classified as a functional ncRNA (non-coding RNA), and it is being elucidated that it plays an important role in various biological phenomena (such as regulation of gene expression etc.). Various miRNAs that has come to be well-known thus far including human miRNA are registered in the miRBase (see http://www.mirbase.org/).

miRNA is indicated to be associated with the onset and progression of e.g. cancer, cardiovascular disease, neurodegenerative disease, psychiatric disease, chronic inflammatory disease, and the like. Particularly in recent years, it has been indicated that miRNA is deeply involved in canceration or aging of cells.

For example, Patent Literature 1 describes that miR-22 promotes the aging of cells and suppresses invasion and metastasis of cancer. Moreover, Patent Literature 2 describes that a composition comprising miR-34 may be employed for cancer therapy.

CITATION LIST

[Patent Literature 1] WO2011/078037
[Patent Literature 2] WO2008/137867

SUMMARY OF THE INVENTION

Problems to be Solved by the Invention

The present inventors diligently searched for miRNAs having therapeutic effect against cancer from among a great number of miRNAs.

Means for Solving the Problems

As a result, the present inventors found particular miR-NAs that have significantly stronger cancer therapeutic effect than the miRNAs described in prior art, thus arriving at the completion of the present invention.

In other words, the present invention relates to a pharmaceutical composition for cancer therapy comprising a transcription or processing product of a gene encoding a miRNA, characterized in that said miRNA is one or more miRNAs selected from the group consisting of miR-3140, miR-137, miR-631, and miR-657.

One embodiment of the present invention is characterized in that said cancer is a solid cancer.

One embodiment of the present invention is characterized in that said solid cancer is colon cancer, pancreatic cancer, tongue cancer, mesothelioma, uterine sarcoma, osteosarcoma, breast cancer, lung cancer, or head and neck cancer.

One embodiment of the present invention is characterized in that said transcription or processing product of a gene

encoding a miRNA is a pri-miRNA, a pre-miRNA, a double-stranded mature-miRNA, a single-strand mature-miRNA expressed from the 5'-end of a pre-miRNA, or a single-strand mature-miRNA expressed from the 3'-end of a pre-miRNA.

One embodiment of the present invention is characterized in that said miRNA is:

(i) a mature-miRNA consisting of a sequence represented by SEQ ID NO. 1, SEQ ID NO. 2, SEQ ID NO. 5, SEQ ID NO. 8, or SEQ ID NO. 11;

(ii) a miRNA having substitution, addition, and/or deletion of 1-5 bases to a mature-miRNA consisting of a sequence represented by SEQ ID NO. 1, SEQ ID NO. 2, SEQ ID NO. 5, SEQ ID NO. 8, or SEQ ID NO. 11, as well as having cancer therapeutic effect; or

(iii) a miRNA having 80% or more sequence homology against a mature-miRNA consisting of a sequence represented by SEQ ID NO. 1, SEQ ID NO. 2, SEQ ID NO. 5, SEQ ID NO. 8, or SEQ ID NO. 11, as well as having cancer therapeutic effect.

One embodiment of the present invention is characterized in that said miRNA is chemically modified.

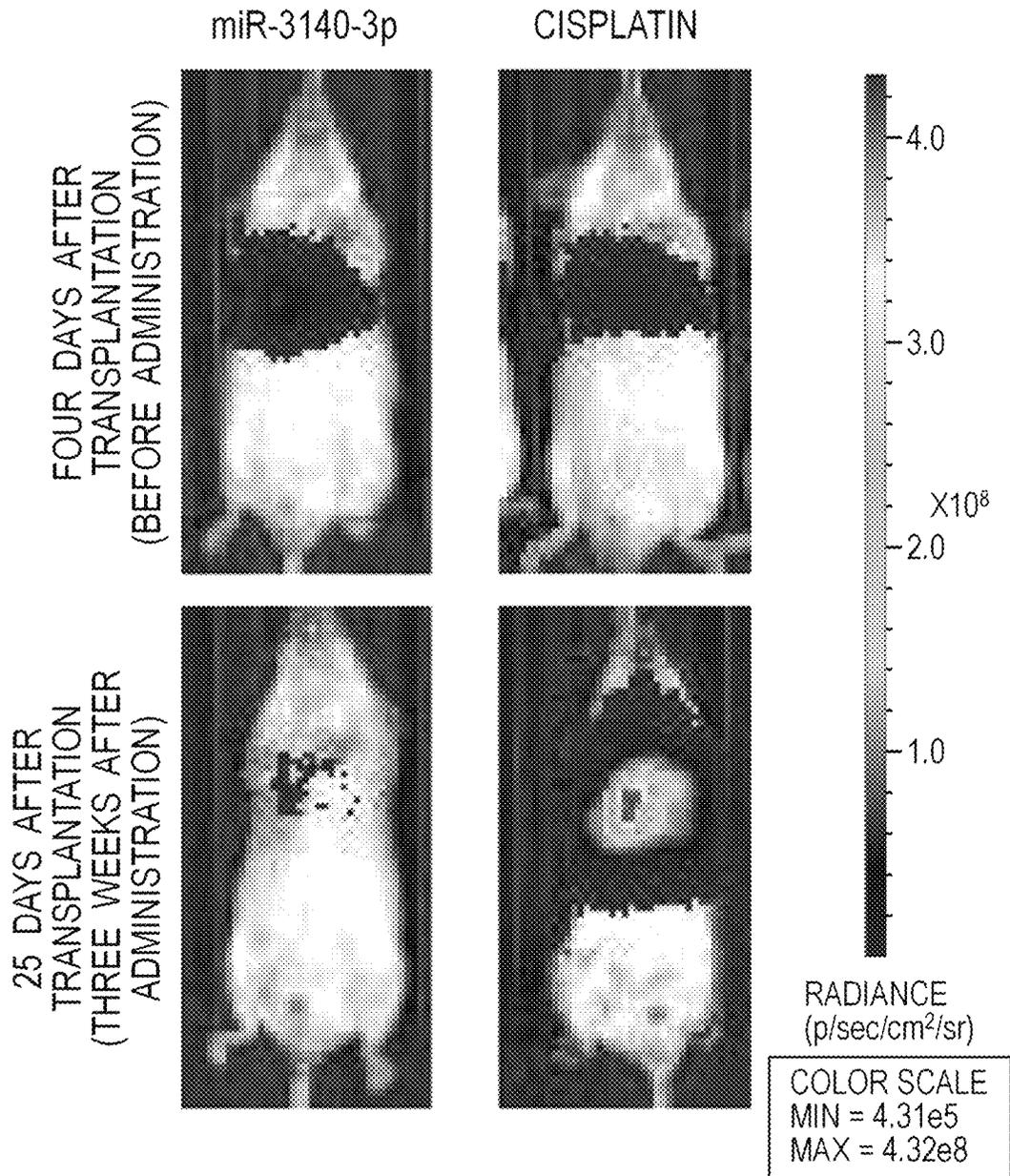One embodiment of the present invention is characterized in that said chemical modification is one or more chemical modifications selected from the group consisting of LNA-tion, BNA-tion, ENA-ation, 2'-OMe modification, phosphorothioation, S-TuD-ation, morpholino modification, peptide addition, glycosylation, aptamer addition, hydrophobic molecule addition, polymer addition, and addition of unmodified DNA.

One embodiment of the present invention is characterized in that said pharmaceutical composition further comprises a nucleic acid transfection agent.

One embodiment of the present invention is characterized in that said transfection agent is a lipid-based transfection agent, a polymer-based transfection agent, a magnetic particle-based transfection agent, an exosome for nucleic acid delivery, or a viral protein for nucleic acid delivery.

One embodiment of the present invention is characterized in that said transfection agent is a transfection agent comprising a peptide represented by amino acid sequences GGGGDD (G4D2), GGGGGGDD (G6D2), GGGGGGGGDD (G8D2), GGGGGGGGGGDD (G10D2), AAAAAAD (A6D), AAAAAADD (A6D2), AAAAAAAK (A6K), AAAAAAKK (A6K2), VVVVVVD (V6D), VVVVVVDD (V6D2), VVVVVVK (V6K), VVVVVVKK (V6K2), LLLLLLD (L6D), LLLLLLDD (L6D2), LLLLLLK (L6K), or LLLLLLKK (L6K2).

One embodiment of the present invention is characterized in that the pharmaceutical composition of the present invention is for topical administration.

One embodiment of the present invention is characterized in that the pharmaceutical composition of the present invention is used in combination with other anticancer agents.

One embodiment of the present invention is characterized in that said other anticancer agents are one or more anticancer agents selected from the group consisting of an alkylating agent, a platinum preparation, a metabolism antagonist, a topoisomerase inhibitor, a microtubular inhibitor, an anti-cancerous antibiotic, a molecular target drug, a hormone preparation, an immunomodulation drug, an interferon, an interleukin, a plant-derived anticancer agent, and a BRM preparation.

Another embodiment of the present invention relates to the use of a transcription or processing product of a gene encoding a miRNA for manufacturing a pharmaceutical composition for cancer therapy, characterized in that said

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miRNA is one or more miRNAs selected from the group consisting of miR-3140, miR-137, miR-631, and miR-657.

Another embodiment of the present invention relates to a cancer therapy method comprising a step of applying to a cancer patient a therapeutically effective amount of an anti-cancerous pharmaceutical composition comprising a transcription or processing product of a gene encoding a miRNA, characterized in that said miRNA is one or more miRNAs selected from the group consisting of miR-3140, miR-137, miR-631, and miR-657.

An invention of any combination of one or more characteristics listed above is encompassed by the scope of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** describes the flow of miRNA screening in the Examples.

FIG. **2** describes the flow of miRNA screening in the Examples.

FIG. **3** shows four miRNAs that show growth inhibition effect against numerous types of cancer cells sorted in miRNA screening.

FIG. **4** shows the effect of the miRNA of the present invention on tongue cancer cell strains (HSC-4 cells and OSC19 cells).

FIG. **5** shows the effect of the miRNA of the present invention on tongue cancer cell strain (SAS cells).

FIG. **6** shows the effect of the miRNA of the present invention on mesothelioma cell strain (MSTO-211H cells).

FIG. **7** shows the effect of the miRNA of the present invention on mesothelioma cell strain (EHMES-10 cells).

FIG. **8** shows the effect of the miRNA of the present invention on uterine sarcoma cell strain (MES-SA cell).

FIG. **9** shows the effect of the miRNA of the present invention on osteosarcoma cell strain (U2-OS cells).

FIG. **10** shows the effect of the miRNA of the present invention on cancer stem cell strains (MDA-MB231-luc-D3H2LN cells).

FIG. **11** shows the effect of the miRNA of the present invention on lung cancer cell strain (A549 cells).

FIG. **12** shows the effect of the miRNA of the present invention on large intestine cancer cell strains (SW620 cells, SW480 cells, and HT29 cells).

FIG. **13** shows the cancer therapeutic effect of the miRNA of the present invention in vivo.

FIG. **14** shows imaging analysis results of tumor tissues at 12, 19, 26, and 33 days after tumor cell transplantation.

FIG. **15** shows a graph quantifying the imaging analysis results from FIG. **14**.

FIG. **16** shows the results of comparing tumor weights at endpoint.

FIG. **17** shows imaging analysis results of tumor tissues after tumor cell transplantation.

FIG. **18** shows the results of comparing tumor weights at endpoint.

FIG. **19** shows the schedule in Experiment 7.

FIG. **20** shows the imaging results when miR-3140-3p is administered once.

FIG. **21** shows the imaging results when miR-3140-3p is administered once.

FIG. **22** shows survival rates of mice when miR-3140-3p is administered once.

FIG. **23** shows the imaging results when miR-3140-3p is administered twice.

FIG. **24** shows the imaging results when miR-3140-3p is administered twice.

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FIG. **25** shows the survival rates of mice when miR-3140-3p is administered twice.

FIG. **26** shows the Imaging results when miR-3140-3p is administered three times.

FIG. **27** shows the Imaging results when miR-3140-3p is administered three times.

FIG. **28** shows the survival rates of mice when miR-3140-3p is administered three times.

FIG. **29** shows the results of Experiment 8.

FIG. **30** shows the comparison of tumor suppression effect between miR-3140-3p and cisplatin.

FIG. **31** shows the comparison of tumor suppression effect between miR-3140-3p and cisplatin.

FIG. **32** shows the comparison of tumor suppression effect between miR-3140-3p and cisplatin.

FIG. **33** shows the comparison of survival rates between miR-3140-3p administration group and cisplatin administration group.

DESCRIPTION OF EMBODIMENTS

The present invention relates to a pharmaceutical composition for cancer therapy comprising a transcription or processing product of a gene encoding a miRNA (microRNA). A general miRNA is biosynthesized via a continuous process. The primary transcription product of a gene encoding a miRNA is called a Primary miRNA transcript (pri-miRNA), and generally has a stem-loop hairpin structure. Pri-miRNA is cleaved by a microprocessor complex, takes a hairpin form by Drosha which is a RNase III-series enzyme, and precursor miRNA (pre-miRNA) which is an intermediate precursor of about 70 bases is produced. The pre-miRNA is then transported from the nucleus to the cytoplasm. In the cytoplasm, it is further cleaved by Dicer which is another RNase III enzyme, and a double-stranded mature miRNA is produced. In general, among the two strands, "-5p" is added to that expressed from the 5'-end of the precursor and "-3p" is added to that expressed from the 3'-end, and are represented as "hsa-miR-21-5p" and "hsa-miR-21-3p". Note that in principle, well-known miRNAs are registered in the miRBase (http://www.mirbase.org/).

Note that only one of the strands in the mature miRNA may exert the desired effect, or each of the stands may exert the desired effect, or the desired effect may be exerted in the double-stranded state. Moreover, the desired effect may also be exerted in pri-miRNA state or pre-miRNA state.

The nucleic acid comprised in the composition of the present invention may be a transcription or processing product of a gene encoding one or more miRNAs selected from the group consisting of miR-3140, miR-137, miR-631, and miR-657, and may also be a variant or a modification that retains the function of the aforementioned nucleic acid.

The sequence of the transcription or processing product of the gene encoding miR-3140 used in one embodiment of the present invention is as follows.

TABLE 1

Name	Sequence
Mature-miRNA (miR-3140-5p)	ACCUGAAUUACCAAAAGCUUU (SEQ ID NO. 1)
Mature-miRNA (miR-3140-3p)	AGCUUUUGGGAAUUCAGGUAGU (SEQ ID NO. 2)

TABLE 1-continued

Name	Sequence
Pre-miRNA	CCUCUUGAGGUACCUGAAUUACCAAAAGCUUUAUGU AUUCUGAAGUUAUUGAAAAUAAGAGCUUUUGGGAAU UCAGGUAGUUCAGGAGUG (SEQ ID NO. 3)

Note that the sequence of the intron region encoding the pri-miRNA of miR-3140 is shown in SEQ ID NO. 4.

The sequence of the transcription or processing product of the gene encoding miR-137 used in one embodiment of the present invention is as follows.

TABLE 2

Name	Sequence
Mature-miRNA (miR-137-3p)	UUAUUGCUUAAGAAUACGCGUAG (SEQ ID NO. 5)
Pre-miRNA	GGUCCUCUGACUCUCUUCGGUGACGGGUAUUCUUGGGU GGAUAAUACGGAUUACGUUGUUAUUGCUUAAGAAUACG CGUAGUCGAGGAGAGUACCAGCGGCA (SEQ ID NO. 6)

Note that the sequence of the intron region encoding the pri-miRNA of miR-137 is shown in SEQ ID NO. 7.

The sequence of the transcription or processing product of the gene encoding miR-631 used in one embodiment of the present invention is as follows.

TABLE 3

Name	Sequence
Mature-miRNA (miR-631-5p)	AGACCUGGCCCAGACCUCAGC (SEQ ID NO. 8)
Pre-miRNA	GUGGGGAGCCUGGUUAGACCUGGCCCAGACCUCAGCUA CACAAGCUGAUGGACUGAGUCAGGGGCCACACUCUCC (SEQ ID NO. 9)

Note that the sequence of the intron region encoding the pri-miRNA of miR-631 is shown in SEQ ID NO. 10.

The sequence of the transcription or processing product of the gene encoding miR-657 used in one embodiment of the present invention is as follows.

TABLE 4

Name	Sequence
Mature-miRNA (miR-657-3p)	GGCAGGUUCUCACCCUCUCUAGG (SEQ ID NO. 11)
Pre-miRNA	GUGUAGUAGAGCUAGGAGGAGAGGGUCCUGGAGAAGCG UGGACCGGUCCGGGUGGGUUCCGGCAGGUUCUCACCCU CUCUAGGCCCCAUUCUCCUCUG (SEQ ID NO. 12)

Note that the sequence of the intron region encoding the pri-miRNA of miR-657 is shown in SEQ ID NO. 13.

The nucleic acid comprised in the composition of the present invention may be e.g. a nucleic acid having substitution, addition, and/or deletion of 1, 2, 3, 4, or 5 bases to a mature-miRNA consisting of a sequence represented by SEQ ID NO. 1, SEQ ID NO. 2, SEQ ID NO. 5, SEQ ID NO. 8, or SEQ ID NO. 11, as well as having the effect of inhibiting cancer cell growth. The substitution of a base to the mature-miRNA may be e.g. a conservative substitution of RNA known in the art.

Moreover, the nucleic acid comprised in the composition of the present invention may be e.g. a nucleic acid having 80% or more (preferably, 85% or more, 90% or more, 95% or more) sequence homology (or sequence identity) to a mature-miRNA consisting of a sequence represented by SEQ ID NO. 1, SEQ ID NO. 2, SEQ ID NO. 5, SEQ ID NO. 8, or SEQ ID NO. 11, as well as having the effect of inhibiting cancer cell growth.

A mature-miRNA consisting of a sequence represented by SEQ ID NO. 1, SEQ ID NO. 2, SEQ ID NO. 5, SEQ ID NO. 8, or SEQ ID NO. 11 can be easily manufactured by a RNA synthesis equipment commonly used in the art, and a nucleic acid having a particular base substituted, added, and/or deleted can similarly be easily manufactured. Moreover, numerous companies accept commissioned synthesis of nucleic acids, and it is also easy to obtain RNA of the desired sequence from such companies. Accordingly, those skilled in the art will be able to investigate the nature and function of a variant or modification of a mature-miRNA consisting of a sequence represented by SEQ ID NO. 1, SEQ ID NO. 2, SEQ ID NO. 5, SEQ ID NO. 8, or SEQ ID NO. 11 by conventional means without excessive burden.

Moreover, the nucleic acid comprised in the composition of the present invention may have received a chemical modification well-known in the art with the purpose of improving the stability or specificity etc. of RNA. Chemical modification that may be employed in the present invention may be e.g. LNA (Locked Nucleic Acid)-tion, BNA (Bridged Nucleic Acid)-tion, ENA (2'-O,4'-C-Ethylene-bridged Nucleic Acids)-tion, 2'-OMe modification, phosphorothioation (S-ation), S-TuD (Synthetic Tough Decoy)-ation, morpholino modification, peptide addition, glycosylation, aptamer addition, hydrophobic molecule addition such as cholesterol, polymer addition such as PEG, or addition of unmodified DNA. These chemical modifications can be performed by a well-known means known in the art.

The present invention can be employed for various cancer therapies, e.g. it can be favorably employed for solid cancer. More preferably, the subject of the present invention may be colon cancer, pancreatic cancer, tongue cancer, mesothelioma, uterine sarcoma, osteosarcoma, breast cancer, lung cancer, or head and neck cancer.

In order to appropriately introduce the present invention to cancer cells, the composition of the present invention may further comprise a nucleic acid transfection agent. Examples of the nucleic acid transfection agent that may be employed for the present invention include a lipid-based transfection agent, a polymer-based transfection agent, a magnetic particle-based transfection agent, an exosome for nucleic acid delivery, or a viral protein for nucleic acid delivery.

An example of the lipid-based transfection agent includes a cationic lipid. With a cationic lipid, nucleic acid-cationic lipid complexes are incorporated into cells via endocytosis and released into the cytoplasm, thus introducing the nucleic acid into cells (lipofection). Specifically, e.g. various commercially available reagents for lipofection may be employed.

An example of the polymer-based transfection agent includes e.g. a cationic polymer. When a cationic polymer comes in contact with a nucleic acid, a nucleic acid-polymer complex is formed, and the complex attaches to the cell membrane via electrostatic interaction and is incorporated into the cell via endocytosis. Specifically, a cationic peptide and a derivative thereof (such as polylysine and polyornithine), a linear or branched-chain synthetic polymer (such as polybrene and polyethyleneimine), a polysaccharide-based

introduction molecule (such as cyclodextrin and chitosan), a natural polymer (such as histone and collagen), as well as active and inactive dendrimers, and the like may be employed. Moreover, transfection agents employed in so-called nanoDDS, such as a transfection agent that employs a block copolymer that forms micellar nanoparticles and a transfection agent that employs carbon nanohorns can also be used for the present invention.

An example of the magnetic particle-based transfection agent includes a transfection agent that employs magnetic particles coated with cation molecules. A magnetic particle-based transfection agent carries out transfection by adhering the nucleic acid on the surface of magnetic particles, and then magnetically introducing the aforementioned magnetic particles into cells. Specifically, for example various commercially available magnetic particles for transfection may be employed.

Moreover, nucleic acid transfection agent that employs a generally available exosome or a transfection agent that utilizes viral proteins such as adenovirus can also be used for the present invention.

Further, in the present invention, a transfection agent comprising a peptide represented by amino acid sequences GGGGDD (G4D2) (SEQ ID NO. 14), GGGGGGDD (G6D2) (SEQ ID NO. 15), GGGGGGGGDD (G8D2) (SEQ ID NO. 16), GGGGGGGGGGDD (G10D2) (SEQ ID NO. 17), AAAAAAD (A6D) (SEQ ID NO. 18), AAAAAADD (A6D2) (SEQ ID NO. 19), AAAAAAK (A6K) (SEQ ID NO. 20), AAAAAAKK (A6K2) (SEQ ID NO. 21), VVVVVVD (V6D) (SEQ ID NO. 22), VVVVVVDD (V6D2) (SEQ ID NO. 23), VVVVVVK (V6K) (SEQ ID NO. 24), VVVVVVKK (V6K2) (SEQ ID NO. 25), LLLLLLD (L6D) (SEQ ID NO. 26), LLLLLLDD (L6D2) (SEQ ID NO. 27), LLLLLLK (L6K) (SEQ ID NO. 28), or LLLLLLKK (L6K2) (SEQ ID NO. 29) may be employed, and in particular AAAAAAD (A6D) or AAAAAAK (A6K) can be favorably employed. The effects of these peptides as transfection agents are disclosed in e.g. WO2010/024262.

The pharmaceutical composition for cancer therapy of the present invention can be used in combination with other anticancer agents well-known in the art. Other anticancer agents used in combination are not limited, and e.g. one or more anticancer agents selected from the group consisting of an alkylating agent, a platinum preparation, a metabolism antagonist, a topoisomerase inhibitor, a microtubular inhibitor, an anti-cancerous antibiotic, a molecular target drug, a hormone preparation, an immunomodulation drug, an interferon, an interleukin, a plant-derived anticancer agent, and a BRM preparation can be employed.

The aspects of combination use of the pharmaceutical composition for cancer therapy of the present invention and the other anticancer agents well-known in the art are not limited, and can be carried out by those skilled in the art (such as a physician) in various aspects according to the type of cancer to be the subject or therapeutic stage and the like. The pharmaceutical composition for cancer therapy of the present invention and the other anticancer agents may be administered to the subject at the same or different times. The pharmaceutical composition for cancer therapy of the present invention and the other anticancer agents may also be prepared as formulations comprising each and administered to a subject. The pharmaceutical composition for cancer therapy of the present invention and the other anticancer agents may also be prepared as a kit that separately comprises each.

An aspect of administering the pharmaceutical composition for cancer therapy of the present invention and the other anticancer agents at the same time may be e.g. an aspect of administering to a subject a formulation comprising the pharmaceutical composition for cancer therapy of the present invention and the other anticancer agents.

In the present invention, an aspect of administering the pharmaceutical composition for cancer therapy of the present invention and the other anticancer agents at different times may be e.g. an aspect of administering each of the pharmaceutical composition for cancer therapy of the present invention and the other anticancer agents with staggered time, and e.g. an aspect of administering the pharmaceutical composition for cancer therapy of the present invention and the other anticancer agents from different administration routes.

The administration route of the pharmaceutical composition for cancer therapy of the present invention is not limited, and may be systemic administration or topical administration. Administration routes can include e.g. oral administration including sublingual administration, parenteral administration such as inhalation administration, direct administration to target tissue by catheter or injection, intravenous administration including infusion, transdermal administration by patches and the like, suppositories, or administration by forced enteral nutrition employing a nasogastric tube, a nasointestinal tube, a gastrostomy tube, or enterostomy tube, and the like.

The dosage form of the pharmaceutical composition for cancer therapy of the present invention may be appropriately determined according to said administration route, and can include, but is not limited to, injections, infusions, tablets, capsules, fine granules, powders, liquids, solutions dissolved in syrups etc., patches, suppositories, and the like.

The subject for administering the pharmaceutical composition of the present invention is not limited, and e.g. the present invention can be employed for mammals (humans, pigs, cows, monkeys, baboons, dogs, cats, rats, mice, and the like). However, when it is unfavorable, humans can be removed from subjects.

The administration method of the pharmaceutical composition of the present invention to a subject (administration route, dosage, administration frequency per day, administration timing, and the like) is not limited, and can be appropriately determined by those skilled in the art (such as a physician) according to the health state of the subject, the extent of disease, the type of agent used in combination, and the like.

The terms used herein, except for those that are particularly defined, are employed for describing particular embodiments, and do not intend to limit the invention.

Moreover, the term "comprising" as used herein, unless the content clearly indicates to be understood otherwise, intends the presence of the described items (such as components, steps, elements, and numbers), and does not exclude the presence of other items (such as components, steps, elements, and numbers).

Unless otherwise defined, all terms used herein (including technical and scientific terms) have the same meanings as those broadly recognized by those skilled in the art of the technology to which the present invention belongs. The terms used herein, unless explicitly defined otherwise, are to be construed as having meanings consistent with the meanings herein and in related technical fields, and shall not be construed as having idealized or excessively formal meanings.

The present invention will now be described in further detail with reference to Examples. However, the present

invention can be embodied by various aspects, shall not be construed as being limited to the Examples described herein.

EXAMPLES

Experiment 1: Screening of miRNA with High Cell Aging Inducibility

(1) Transfection of all miRNAs into TIG-3 Cells (FIG. 1)

A total of 2028 types of miRNAs (mirVana; Ambion) were transfected into TIG-3 cells (human fibroblasts) with an auto dispenser Bravo (Agilent). Transfection was carried out by the following protocol.

1: To 70 μL of serum free medium (SFM) was added 0.35 μL of RNAiMAX (Invitrogen).
2: The solution from 1 was added to a 96-well plate (μ-plate; ibidi) with Bravo.
3: To 2 was added 0.7 μL of miRNA (Stock Conc. 2 μM) with Bravo, and this was mixed by pipetting.
4: This was incubated at room temperature for 20 minutes.
5: A cell suspension diluted to 3.5×10^4 cells/mL was dispensed at 70 μL each with Bravo.
6: This was incubated at 37° C. under 5% CO_2 condition.

(2-1) Staining of Transfected Cells

Setting the day of transfection as Day 0, staining was performed five days later in order to evaluate the number of cells and cell size. The protocol therefor is shown below.

1: Washing twice with PBS (−) was carried out.
2: 3.7% formalin solution was added, and this was incubated at room temperature for 10 minutes to fix the cells.
3: Washing twice with PBS (−) was carried out.
4: Staining solution was added, and this was incubated at room temperature for 30 minutes for staining.
5: Washing three times with PBS (−) was carried out.
6: The plate after completion of staining was subjected to full visual field photographing with an automatic photographing equipment Operetta (Perkin Elmer).
7: The photographs taken were subjected to quantitative analysis with an image analysis software Columbus (Perkin Elmer).

TABLE 5

Composition of the staining solution

Reagent name	1 mL	final Conc.
PBS (—)	1 mL	
Triton X-100 (NACALAI TESQUE)	1 μL	0.1%
BSA (Sigma-Aldrich)	10 mg	1%
Alexa Fluor ® 488 Phalloidin (Thermo Fisher Scientific)	4 μL	0.8 Unit
DAPI (1 mg/mL) (DOJINDO)	0.1 μL	0.1 μg/mL

(2-2) SA-β-Galactosidase Assay of Transfected Cells

Setting the day of transfection as Day 0, SA-β-galactosidase assay was performed on Day 7. The operating protocol is shown below.

1: Washing twice with PBS (−) was carried out.
2: 2% formalin solution was added, and this was incubated at room temperature for 5 minutes to fix the cells.
3: Washing twice with PBS (−) was carried out.
4: β-Gal staining solution was prepared at the time of use and added to the wells.
5: This was incubated at 37° C. for 12-16 hours.
6: The plate after completion of staining was photographed with an automatic photographing equipment Opera (Perkin Elmer).

TABLE 6

Composition of β-Gal staining solution

Reagent name	stock conc.	final conc.
citric acid/Na phosphate buffer *[1]	0.2M	40 mM
$K_4\{e(CN)_6\}H_2O$	100 mM	5 mM
$K_3\{Fe(CN)_6\}$	100 mM	5 mM
NaCl	5M	150 mM
$MgCl_2 \cdot 6H_2O$	1M	2 mM
H_2O		
X-gal *[2]	20 mg/mL	1 mg/mL

*[1] Prepared so that pH is 6.0.
*[2] X-gal (5-Bromo-4-chloro-3-indoyl-β-D-Galactopyranoside: Wako) was prepared at the time of use with N.N-dimethyl formamide.

(3) Analysis of the Screening Result (FIG. 2)

Each of the values of the number of cells and cell size obtained were scored with the numeric values of random sequence miRNA which is the negative control and the numeric values of miR-34a-Sp which is the positive control. The scoring method is shown below.

Within Each Plate

1: The value of the positive control was subtracted from the value of the negative control.
2: The value of each miRNA was subtracted from the value of the negative control.
3: The value from 2 was divided by the value from 1 to obtain a score value.
4: A scatter diagram was drawn by taking the score value of the number of cells on the horizontal axis and the score value of the cell size on the vertical axis.
5: 579 types of miRNAs where at least one of the two showed a score value higher than the score values of miR-22-3p and miR-22-5p were identified as aging induction miRNA candidates.
6: Out of the 579 types of candidates, 349 types of miRNAs that induced activation of β-galactosidase which is a cell aging marker were identified as aging induction miRNAs.

Experiment 2: Further Screening Employing Cancer Cell Strains

The 349 types of aging induction miRNA (mirVana; Ambion) obtained from screening were transfected into various cancer cell strains (large intestine cancer cell strain HCT116 (p53 wildtype and p53 deletion), pancreatic cancer cell strains BxPC-3 and CFPAC-1, and tongue cancer cell strain HSC-4) with an auto dispenser Bravo (Agilent).

Transfection was carried out with the following protocol.

1: To 70 μL of serum free medium (SFM) was added 0.35 μL of RNAiMAX (Invitrogen).
2: The solution from 1 was added to a 96-well plate (μ-plate; ibidi) with Bravo.
3: To 2 was added 0.7 μL of miRNA (Stock Conc. 200 nM) with Bravo, and this was mixed by pipetting.
4: This was incubated at room temperature for 20 minutes.
5: A cell suspension diluted to 3.5×10^4 cells/mL was dispensed at 70 μL each with Bravo.
6: This was incubated at 37° C. under 5% CO_2 condition.

Setting the day of transfection as Day 0, on Day 5 the cell survival rate was evaluated with PrestoBlue (Invitrogen). The operating protocol is shown below.

1. The medium was exchanged to a medium comprising PrestoBlue diluted 20-folds, and this was incubated at 37° C. for 1 hour.

2. The fluorescence value (Ex/Em=560 nm/590 nm) was measured with Enspire (Perkin Elmer).

3. The cell survival rate was determined by setting the fluorescence value obtained from the well with only the reagent as the background.

The above protocol was carried out for each cancer cell strain (large intestine cancer cell strain HCT116 (p53 wild-type and p53 deletion), pancreatic cancer cell strains BxPC-3 and CFPAC-1, and tongue cancer cell strain HSC-4), and the miRNAs that suppress cell proliferation more significantly than miR-34a-5p were sorted.

As a result of sorting the miRNAs that suppress cell proliferation more significantly than miR-34-5p commonly

5: This was incubated at 37° C. under 5% CO_2 condition.

6: Operations from 1-3 were repeated two days after transfection.

7: The solutions prepared in 6 were each added to the dish cultured in 5.

8: The cells were counted seven days after the first transfection.

As shown in FIG. **5**, any of the four miRNAs showed cell growth inhibition effect against tongue cancer cell strain SAS.

[Table 7]

TABLE 7

	miRNA dosage					
Stock(20 μM)	Control	miR-137-3p	miR-631-5p	miR-657-3p	miR-3140-3p	Combination
miR Control	4 μL	3 μL	3 μL	3 μL	3 μL	—
miR-137-3p	—	1 μL	—	—	—	1 μL
miR-631-5p	—	—	1 μL	—	—	1 μL
miR-657-3p	—	—	—	1 μL	—	1 μL
miR-3140-3p	—	—	—	—	1 μL	1 μL
Total	4 μL	4 μL	4 μL	4 μL	4 μL	4 μL

in all cell strains, four miRNAs (miR-137-3p, miR-631-5p, miR-657-3p, and miR-3140-3p) were found (FIG. **3**).

Experiment 3. Confirmation of Cell Growth Inhibition Effect Employing Various Cancer Cell Strains

(1) Tongue Cancer Cell Strain (HSC-4 and OSC-19) (FIG. **4**)

Four miRNAs (miR-137-3p, miR-631-5p, miR-657-3p, and miR-3140-3p) were transfected into tongue cancer cell strains (HSC-4 and OSC-19), and cell proliferation was observed. Transfection was carried out with the following protocol.

1: To a 35 mm dish were added 500 μL of serum free medium (SFM) and 5 μL of RNAiMAX (Invitrogen).

2: To the solution from 1 was added 1 μL each of nucleic acids (Control, miR-137-3p, miR-631-5p, miR-657-3p, miR-3140-3p, and a mixture of equal amounts of the four miRNAs (final concentration 10 nM).

3: This was incubated at room temperature for 20 minutes.

4: A cell suspension diluted to $6.7×10^4$ cells/mL was added to the 35 mm dish at 1.5 mL each.

5: This was incubated at 37° C. under 5% CO_2 condition.

6: The cells were counted five days after transfection.

As shown in FIG. **4**, the four miRNAs showed cell growth inhibition effect in both tongue cancer cell strains.

(2) Tongue Cancer Cell Strain (SAS) (FIG. **5**)

Four miRNAs (miR-137-3p, miR-631-5p, miR-657-3p, and miR-3140-3p) were transfected into a tongue cancer cell strain (SAS), and cell proliferation was observed. Transfection was carried out with the following protocol.

1: To a 35 mm dish were added 500 μL of serum free medium (SFM) and 5 μL of RNAiMAX (Invitrogen).

2: To the solution from 1 was added 4 μL each of the miRNA solutions (see Table 7) (final concentration 10 nM).

3: This was incubated at room temperature for 20 minutes.

4: 1.5 mL of a cell suspension diluted to $6.7×10^4$ cells/mL was added to the 35 mm dish.

(3) Malignant Pleural Mesothelioma Cell Strains, Uterine Sarcoma Cell Strain, and Osteosarcoma Cell Strain (FIGS. **6-9**)

Among the above four miRNAs, miR-3140-3p which had particularly high cell growth inhibition effect was transfected in each of malignant pleural mesothelioma cell strains (MSTO-211H and EHMES-10), uterine sarcoma cell strain (MES-SA), and osteosarcoma cell strain (U2-OS), and cell proliferation was observed. As comparison subjects, miR-22-3p and miR-34a-5p which showed cell growth inhibition effect in prior research were employed. Transfection was carried out with the following protocol.

1: To a 35 mm dish were added 500 μL of serum free medium (SFM) and 5 μL of RNAiMAX (Invitrogen).

2: To the solution from 1 was added 1 μL each of miR-Control or miR-3140-3p, miR-22-3p, and miR-34a-Sp (stock conc. 20 μM) (final concentration 10 nM).

3: This was incubated at room temperature for 20 minutes.

4: 1.5 mL of a cell suspension diluted to $6.7×10^4$ cells/mL was added to the 35 mm dish.

5: This was incubated at 37° C. under 5% CO_2 condition.

6: The cells were counted four days after transfection.

As shown in FIGS. **6-9**, in any of the cell strains, miR-3140-3p showed extremely high cell growth inhibition effect compared to prior art miR-22-3p and miR-34a-5p.

(4) Breast Cancer Stem Cell Strain (MDA-MB231-Luc-D3H2LN Cells) (FIG. **10**)

miR-3140-3p was transfected in a highly metastatic cancer cell strain of breast cancer (MDA-MB231-luc-D3H2LN cells), and cell proliferation was observed. As comparison subjects, miR-22-3p and miR-34a-5p which showed cell growth inhibition effect in prior research were employed. Transfection was carried out with the following protocol.

1: To a 35 mm dish were added 500 μL of serum free medium (SFM) and 5 μL of RNAiMAX (Invitrogen).

2: To the solution from 1 was added 12.5 μL each of miR-Control or miR-3140-3p, miR-22-3p, and miR-34a-5p (stock conc. 2 μM) (final concentration 12.5 nM).

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3: This was incubated at room temperature for 20 minutes.

4: 1.5 mL of a cell suspension diluted to 6.7×10^4 cells/mL was added to the 35 mm dish.

5: This was incubated at 37° C. under 5% CO_2 condition.

6: The cells were counted four days after transfection.

Moreover, by the protocol below, the expression of apoptosis marker Annexin V in breast cancer cells transfected with miR-3140-3p was analyzed.

1: Transfection of miR-3140-3p was performed with a protocol similar to that described above.

2: Six days after transfection, cells were recovered together with the supernatant.

3: Samples for FACS were prepared according to the protocol of the Annexin V assay kit.

4: Cells stained by Annexin V-FITC were stained with an antibody against cancer stem cell marker CD44 (eBio-Science).

5: The prepared samples were analyzed with Cell Sorter (SONY).

As shown in FIG. **10** top, miR-3140-3p showed extremely high cell growth inhibition effect against breast cancer stem cell strain (MDA-MB231-luc-D3H2LN cells).

Moreover, as shown in FIG. **10** bottom, in breast cancer stem cells at six days after transfection of miR-3140-3p, apoptosis marker Annexin V was highly positive (96.97%). In other words, it was shown that miR-3140-3p significantly induces apoptosis against cancer stem cells.

(5) Lung Cancer Cell Strain (A549) (FIG. **11**)

miR-3140-3p was transfected into lung cancer cell strain (A549), and cell proliferation was observed. As comparison subjects, miR-22-3p and miR-34a-5p which showed cell growth inhibition effect in prior research were employed. Transfection was carried out with the following protocol.

1: To a 35 mm dish were added 500 μL of serum free medium (SFM) and 5 L of RNAiMAX (Invitrogen).

2: To the solution from 1 was added 1 μL each of miR-Control or miR-3140-3p, miR-22-3p, and miR-34a-Sp (stock conc. 20 μM) (final concentration 10.0 nM).

3: This was incubated at room temperature for 20 minutes.

4: 1.5 mL of a cell suspension diluted to 6.7×10^4 cells/mL was added to the 35 mm dish.

5: This was incubated at 37° C. under 5% CO_2 condition.

6: The cells were counted six days after transfection.

As shown in FIG. **11**, miR-3140-3p showed extremely high cell growth inhibition effect against lung cancer cell strain (A549).

(6) Large Intestine Cancer Cell Strains (SW620, SW480, and HT29) (FIG. **12**)

miR-3140-3p was transfected into large intestine cancer cell strains (SW620, SW480, and HT29), and cell proliferation was observed. Transfection was carried out with the following protocol.

1: To a 35 mm dish were added 500 μL of serum free medium (SFM) and 5 μL of RNAiMAX (Invitrogen).

2: To the solution from 1 was added 12.5 μL each of miR-Control or miR-3140-3p, miR-22-3p, and miR-34a-Sp (stock conc. 2 μM) (final concentration 10.0 nM).

3: This was incubated at room temperature for 20 minutes.

4: 1.5 mL of a cell suspension diluted to 6.7×10^4 cells/mL was added to the 35 mm dish.

5: This was incubated at 37° C. under 5% CO_2 condition.

6: The cells were counted seven days after transfection.

Results are shown in FIG. **12**. Setting the number of control introduction cells as 100%, the survival rate of cells in which miR-3140-3p was introduced was shown in %. As

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shown in FIG. **12**, miR-3140-3p showed extremely high cell growth inhibition effect against any of the large intestine cancer cell strains.

Experiment 4. Antitumor Effect of the miRNA of the Present Invention In Vivo (Malignant Pleural Mesothelioma Cells) (FIG. **13**)

In order to verify the antitumor effect of the miRNA of the present invention in vivo, experiments was performed with laboratory animals transplanted with malignant pleural mesothelioma cells.

(1) Preparation of Cells

Malignant pleural mesothelioma cells MSTO-211H cells were used.

1: The cells on the dish were washed twice with PBS (−).

2: The cells were detached with trypsin.

3: This was suspended in a medium, and cells were counted.

4: Centrifugation at a condition of 1000 rpm for 3 min was performed to pellet down.

5: The cells were resuspended in PBS (−) in order to obtain 2.0×10^7 cells/mL.

(2) Cell Transplantation to Mice

Six weeks-old C-B-17/Icr-scid/scid Jel (SCID mouse) were used as mice. SCID mice were subcutaneously administered 100 μL of the prepared cell suspension, and the cells were allowed to settle

(3) miRNA Administration

Negative control which is the control sequence and miR-3140-3p which is the miRNA of the present invention were employed. A6K (from 3D Matrix) was employed as the nucleic acid delivery reagent. The administration of miRNA to mice was carried out with the following protocol.

1: 100 μM of the nucleic acid (miRNA) was diluted with 10% saline and sterilized water in order to obtain 71.4 μM.

2: 1% A6K solution was sonicated for 5 minutes before use.

3: The diluted nucleic acid and the 1% A6K solution were mixed at a proportion of 1:1 to give the administration nucleic acid.

4: SCID mice were subcutaneously administered (tumor site) 50 μL each of the administration nucleic acid.

(5) Evaluation

The experimental results were evaluated with the following protocol.

1: From four days after transplantation, the nucleic acid was administered every one or two days.

2: A total of 13 administrations were performed, and 34 days after transplantation was set as the endpoint.

3: Mice were dissected, and the subcutaneous tumor was resected and weighed.

Experimental results are shown in FIG. **13** (n=3). As shown in FIG. **13**, compared to the control group, the tumor weight was significantly lower in mice in which miR-3140-3p was introduced at the tumor site.

Experiment 5. Antitumor Effect of the miRNA of the Present Invention In Vivo (Malignant Pleural Mesothelioma Cells) (FIG. **14-16**)

(1) Preparation of Cells

Malignant pleural mesothelioma cells EHMES-10 cells were used.

1: The cells on the dish were washed twice with PBS (−).

2: The cells were detached with trypsin.

3: This was suspended in a medium, and cells were counted.

4: Centrifugation at a condition of 1000 rpm for 3 min was performed to pellet down.

5: The cells were resuspended in PBS (−) in order to obtain 2.0×10^7 cells/mL.

(2) Cell Transplantation to Mice

Six weeks-old C-B-17/Icr-scid/scid Jcl (SCID mouse) were used as mice. SCID mice were subcutaneously administered 100 μL of the prepared cell suspension, and the cells were allowed to settle.

(3) miRNA Administration

Negative control which is the control sequence and miR-3140-3p which is the miRNA of the present invention were employed. A6K (from 3D Matrix) was employed as the nucleic acid delivery reagent. The administration of miRNA to mice was carried out with the following protocol.

1: 100 μM of the nucleic acid (miRNA) was diluted with 10% saline and sterilized water in order to obtain 71.4 μM.

2: 1% A6K solution was sonicated for 5 minutes before use.

3: The diluted nucleic acid and the 1% A6K solution were mixed at a proportion of 1:1 to give the administration nucleic acid.

4: SCID mice were subcutaneously administered (tumor site) 50 μL each of the administration nucleic acid.

(5) Evaluation

The experimental results were evaluated with the following protocol.

1: From two days after transplantation, the nucleic acid was administered every one or two days.

2: A total of 13 administrations were performed, and 33 days after transplantation was set as the endpoint.

3: At 12, 19, 26, and 33 days after transplantation, luciferin was intraperitoneally administered for imaging in order to trace the tumor size.

4: Mice were dissected at the endpoint, and the subcutaneous tumor was resected and weighed.

Imaging analysis results of tumor tissues at 12, 19, 26, and 33 days after tumor cell transplantation are shown in FIG. **14** and FIG. **15**. As shown in FIG. **14** and FIG. **15**, compared to the control group, expansion of the tumor was suppressed in mice in which miR-3140-3p was introduced at the tumor site. Moreover, a similar result was shown in FIG. **16** which compares the tumor weight at endpoint.

Experiment 6. Antitumor Effect of the miRNA of the Present Invention In Vivo (Tongue Cancer Cell) (FIGS. **17** and **18**)

(1) Preparation of Cells

Tongue cancer cell strain HSC-4 cells were used.

1: The cells on the dish were washed twice with PBS (−).

2: The cells were detached with trypsin.

3: This was suspended in a medium, and cells were counted.

4: Centrifugation at a condition of 1000 rpm for 3 min was performed to pellet down.

5: The cells were resuspended in PBS (−) in order to obtain 2.0×10^7 cells/mL.

(2) Cell Transplantation to Mice

Six weeks-old C-B-17/Icr-scid/scid Jcl (SCID mouse) were used as mice. SCID mice were subcutaneously administered 100 μL of the prepared cell suspension, and the cells were allowed to settle.

(3) miRNA Administration

Negative control which is the control sequence and miR-3140-3p, miR-137, miR-631 and miR-657 which are the miRNAs of the present invention were employed. A6K (from 3D Matrix) was employed as the nucleic acid delivery reagent. The administration of miRNA to mice was carried out with the following protocol.

1: 100 μM of the nucleic acid (miRNA) was diluted with 10% saline and sterilized water in order to obtain 71.4 μM.

2: 1% A6K solution was sonicated for 5 minutes before use.

3: The diluted nucleic acid and the 1% A6K solution were mixed at a proportion of 1:1 to give the administration nucleic acid.

4: SCID mice were subcutaneously administered (tumor site) 50 μL each of the administration nucleic acid.

(5) Evaluation

The experimental results were evaluated with the following protocol.

1: From three days after transplantation, the nucleic acid was administered every one or two days.

2: A total of 11 administrations were performed, and 28 days after transplantation was set as the endpoint.

3: At 7, 14, 21, and 28 days after transplantation, luciferin was intraperitoneally administered for imaging in order to trace the tumor size.

4: Mice were dissected at the endpoint, and the subcutaneous tumor was resected and weighed.

Imaging analysis results of tumor tissues after tumor cell transplantation are shown in FIG. **17**. As shown in FIG. **17**, compared to the control group, expansion of the tumor was suppressed in mice in which the miRNA of the present invention was introduced at the tumor site. Moreover, a similar result was shown in FIG. **18** which compares the tumor weight at endpoint.

From the above results, it was shown that the miRNA of the present invention also exerts extremely strong antitumor effect in vivo.

Experiment 7. Antitumor Effect of the miRNA of the Present Invention In Vivo (Malignant Pleural Mesothelioma Cells) (FIGS. **19-28**)

The tumor suppression effect of miR-3140-3p in vivo was investigated with intrathoracic orthotopic transplantation model mouse.

Six weeks-old male mice (C-B-17/Icr-scid/scid Jcl) were used as mice. Malignant pleural mesothelioma cell strain EHMES-10 which expresses the luciferase gene was used as the tumor cell.

The experiment protocol is shown below.

1: Mice were intraperitoneally administered 0.1 mL per 10 g of body weight of a mixed anesthetic drug of medetomidine hydrochloride, midazolam, and butorphanol tartrate.

2: After anesthesia, mouse chest hair was shaved, and an incision was made in the epidermis with scissors.

3: In the mouse pleural cavity 100 μL of tumor cells (3×10^7 cells/mL) was transplanted with a 27 G syringe for insulin.

4: Three days after transplantation, imaging of tumor cells was performed with IVIS Spectrum CT In vivo Imaging System.

5: After imaging, grouping was performed with successfully transplanted mice.

6: Mice were intraperitoneally administered 0.1 mL per 10 g of body weight of a mixed anesthetic drug of

medetomidine hydrochloride, midazolam, and butor-
phanol tartrate to anesthetize the mice.

7: After anesthesia, 100 μL of miRNA/A6K mixture was
administered in the mouse pleural cavity.

8: Imaging was performed every week from the first
imaging, and tumor expansion was observed.

9: The time and date of death of the mice was recorded,
and mice survival rate was calculated.

Administration and imaging schedule is shown in FIG.
19. The mixed anesthetic drug of medetomidine hydrochlo-
ride, midazolam, and butorphanol tartrate was prepared as in
Table 8 below. The miRNA/A6K mixture was prepared as in
Table 9. Moreover, the control group was administered the
RNA shown in Table 10 instead of the miRNA of the present
invention.

Note that in order to improve expression efficiency,
miRNA was administered as a double-strand in combination
with a complementary strand comprising partial mismatch.

TABLE 8

Preparation of mixed anesthetic drug			
	Medetomidine hydrochloride (1 mg/mL)	Midazolam (5 mg/mL)	Butorphanol tartrate (0.5 mg/mL)	Water for injection
Required amount of stock solution	0.75 mL	2 mL	2.5 mL	19.75 mL

TABLE 9

Preparation of miRNA/A6K mixture	
	/120 μL
100 μM miRNA	40 μL
10% saline	10.8 μL
1% A6K	50 μL
Water for injection	9.2 μL

miRNA is administered at 3.2 nmol (45 μg) per mouse.

TABLE 10

Sequences of control and miR-3140-3p	
	Sequence
Control	5'UUCUCCGAACGUGUCACGU (SEQ ID NO. 30)
	5'ACGUCACACGUUCGGAGAA (SEQ ID NO. 31)
miR-3140-3p	5'AGCUUUUGGGAAUUCAGGUAGU (SEQ ID NO. 2)
	5'UACCUGAAUUCCCAAAAGCUUU (SEQ ID NO. 32)

Experimental results are shown in FIG. **20** to FIG. **28**.

In the group with one administration of miR-3140-3p,
tumor reduction was seen by the second imaging (Day 10
after transplantation), and the effect had persisted until the
fourth imaging (Day 24 after transplantation) (FIG. **20**).

The imaging results were digitized and graphed, and it
was shown that miR-3140-3p significantly suppressed tumor
expansion (FIG. **21**).

By comparing the survival rates of mice, it was observed
that the survival rates of mice had improved in the miR-
3140-3p administration group (FIG. **22**).

It was shown that similarly to the group with one admin-
istration, miR-3140-3p also significantly suppressed malig-
nant pleural mesothelioma in the groups with two and three
administrations of miR-3140-3p (FIGS. **23-28**).

The survival rates of mice were more improved in the
group with three administrations of miR-3140-3p (FIG. **28**).

Experiment 8. Calculation of IC_{50} Value (FIG. **29**)

The IC_{50} value of miR-3140-3p was calculated with
malignant pleural mesothelioma cell EHMES-10.

The protocol therefor is shown below.

1: To 25 μL of serum free medium (SFM) was added 0.25
μL of RNAiMAX (Invitrogen).

2: miR-Control and miR-3140-3p were serially diluted so
that the final concentrations will be 40 nM, 20 nM, 10
nM, 5 nM, 1 nM, 500 pM, 100 pM, 50 pM, 10 pM, 5
pM, and 1 pM, and mixed with SFM/RNAiMAX
complex.

3: This was incubated at room temperature for 20 minutes.

4: 75 μL of each of cells at 6.7×10^4 cells/mL were added
to each well.

5: This was incubated at 37° C. under 5% CO_2 condition.

6: Five days after transfection, the survival rates of cells
were investigated with Cell Counting Kit 8 (DO-
JINDO). The protocol therefor is shown below.

(i) Cell Counting Kit was diluted 10-folds with a
medium.

(ii) 200 μL of each of the diluted Cell Counting Kit was
added to each well.

(iii) This was incubated at 37° C. under 5% CO_2
condition for 1 hour.

(iv) The values at 450 nm/600 nm were measured with
a plate reader.

Note that the same control RNA as that used in Experi-
ment 7 was employed as the control.

Results are shown in FIG. **29**. As shown in FIG. **29**, it was
revealed that miR-3140-3p shows growth inhibition effect
against malignant pleural mesothelioma cell strain EHMES-
10 even at a very low concentration. Calculation of the IC_{50}
value gave a final concentration of 0.57 nM.

Experiment 9. Comparison of Antitumor Effect with Chemotherapy Agents (FIGS. **30-33**)

In order to investigate the relative superiority of antitumor
effect of miR-3140-3p, the tumor suppression effect of
cisplatin which is the first-line drug of malignant pleural
mesothelioma and the tumor suppression effect of miR-
3140-3p were compared in vivo.

Six weeks-old male mice (C-B-17/Icr-scid/scid Jcl) were
used as mice. Malignant pleural mesothelioma cell strain
EHMES-10 which expresses the luciferase gene was used as
the tumor cell.

The protocol is shown below.

1: Mice were intraperitoneally administered 0.1 mL per
10 g of body weight of a mixed anesthetic drug of
medetomidine hydrochloride, midazolam, and butor-
phanol tartrate.

2: After anesthesia, mouse chest hair was shaved, and an
incision was made in the epidermis with scissors.

3: In the mouse pleural cavity 100 μL of tumor cells
(3×10^7 cells/mL) was transplanted with a 27 G syringe
for insulin.

4: Four days after transplantation, imaging of tumor cells
was performed with IVIS Spectrum CT In vivo Imag-
ing System.

5: After imaging, grouping was performed with success-
fully transplanted mice.

6: Mice were intraperitoneally administered 0.1 mL per
10 g of body weight of a mixed anesthetic drug of

medetomidine hydrochloride, midazolam, and butor-phanol tartrate to anesthetize the mice.

7: After anesthesia, 100 μL of the miRNA/A6K mixture was administered in the pleural cavity for the miRNA administration group, and cisplatin (6 mg/kg) was intraperitoneally administered to cisplatin administration group.

8: Imaging was performed every week from the first imaging, and tumor expansion was observed.

The mixed anesthetic drug was prepared as in Table 8 shown above. The miRNA/A6K mixture was prepared as in Tables 9 and 10 shown above. Cisplatin was prepared as in Table 11 below.

TABLE 11

Preparation of cisplatin	
	/mL
Cisplatin (25 mg/50 mL)	600 μL
DW	400 μL

Note that the same control RNA as that used in Experiment 7 was employed as the control.

Experimental results are shown in FIGS. **30-33**. As shown in each figure, it was shown that miR-3140-3p may exert an antitumor effect that is equivalent or higher compared to cisplatin which is also the first-line drug of malignant pleural mesothelioma.

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atcttattt                                                            2469


<210> SEQ ID NO 8
<211> LENGTH: 21
<212> TYPE: RNA
<213> ORGANISM: Homo sapiens

<400> SEQUENCE: 8

agaccuggcc cagaccucag c                                               21


<210> SEQ ID NO 9
<211> LENGTH: 75
<212> TYPE: RNA
<213> ORGANISM: Homo sapiens

<400> SEQUENCE: 9

gugggggagcc ugguuagacc uggcccagac cucagcuaca caagcugaug gacugaguca      60

ggggccacac ucucc                                                      75


<210> SEQ ID NO 10
<211> LENGTH: 1037
<212> TYPE: DNA
<213> ORGANISM: Homo sapiens

<400> SEQUENCE: 10

ctgtgggaca gaggaacagg cagagatcag agggcaggct caggttggga ggagtgggga      60

gcctggttag acctggccca gacctcagct acacaagctg atggactgag tcaggggcca     120

cactctccct cctctggtga tgtgacctca gctggtttct tcccactcgg ccatgggttt     180

cccatcctgg agtgggatta agaatccttg tcctggccct gtgcagtggc cacacctgta     240

atcccgacac tttgggaagc ttagatggga gaatccctag gggccaggag ttcaatacca     300

gcctgggcaa cataggggaga ccctgtctct acaaaaaaaa tttttaacaa ttagcccggt     360

gtggtggtgt gagcctgtag tcctagctac ttagaggcag atgtgggagg atcacttgag     420

cccagtttga ggctagtcca ggcaacatgg caagatccta tctctaccaa aaatatatat     480

aaacgtgcgt gtgtgtgtgt gtgtgtgtgt gtgtataaat atataaaga atccttgtcc     540

tgcctgtctc atgggcagct tggaggaaac actgtttttt tgtttttttt tttttttgaga     600

tggagttttg ctcttgttgc ccaggctgga gtgcaatggc acgatctcag ctcaactgca     660

acctccacct cctgggttta agcgattttc ctgcctcatc ctcccgagta gctgagatta     720

caggtgccca ccaccacacc tggctaattt tttgcattttt tagtagagat ggggtttcac     780

catgttggcc aggatggtct cgaactcctg acctcaggtg agccacccca ctcggcctcc     840
```

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cgaagtgctg ggattacagg catgagccac tgcgcccagc ctggaaacac tattgacaag     900

tgaggaggcc tagtccattg agtatcagct agggctacaa acttccaaat cggtgaatca     960

ggtccagaga gggacaagtg ccccaggggtt acacaatcat ttgctgaagc agaggttgct    1020

gccatctttg gcctcac                                                    1037


<210> SEQ ID NO 11
<211> LENGTH: 23
<212> TYPE: RNA
<213> ORGANISM: Homo sapiens

<400> SEQUENCE: 11

ggcagguucu cacccucucu agg                                              23


<210> SEQ ID NO 12
<211> LENGTH: 98
<212> TYPE: RNA
<213> ORGANISM: Homo sapiens

<400> SEQUENCE: 12

guguaguaga gcuaggagga gaggguccug agaaagcgug gaccgguccg ggugggguucc     60

ggcagguucu cacccucucu aggccccauu cuccucug                              98


<210> SEQ ID NO 13
<211> LENGTH: 1412
<212> TYPE: DNA
<213> ORGANISM: Homo sapiens

<400> SEQUENCE: 13

gtgagggcgg gcgcgggcca gcggccggga agccctaggc caggcccctc ccctgaagga      60

agggcatagg gcgggtcctg cctcaggggg cttgcgagga ccggccaggt tcatctcatg     120

cagcatcaga caaccactat gcagagggat tttatgacgt ttttgaaaaa ttgggaagac     180

aatggtttga cacccacttt gcaggtttag acgaagagat gcgtactgtc aagctggcct     240

gttctctgtc cccgaggcag tcagccagca ccctgcagcc ccgcgccaac cccacactct     300

gctaagccct cgctttgggg cttgaggag acagaccctg cttcgaagga ccctggaggg     360

agggttctgt cctgcttggg ccaggatgcc cagcccctgg gaccccgggg ggacatgct      420

ggaagaagtg gcgaaggaca cgtggccccg tcagccccag acgccgcacg gctgtcctct     480

ccaacaatat cctggtgctg agtgatgact caggcgactc cagcatcagt gattttgttg     540

aagagggcag ctgccagcct cccgacctgc ctgccgggcc ccagctgccc tgccccaac     600

cccaacccac cccactccac cccctaggcc caggacacat ggccctgtag cgatcccctg     660

gcacgcagac atgggttta tgtgggggag gacaggctgg gttggcctct gtccccaccc      720

tgagtcctga gcacagaagt aatacggcag ctgtggtaat atctacccag taccctgtgc     780

ctcctcacac ccacgtgacc agccaggcag ggttcaaagc cagcagccaa ggcaggctgg     840

gttggaggta gtgccaggcg taacctgcat tctttccaga ccctacccaa ccctggggcc     900

agtggtggct caagtgagag tgagctccag ctctgagtgg gcatggcagg gctggaccct     960

aaaactggac tccggcagcc ggcaggaccc ctggacact ccaggcctca gtttccccat     1020

caattcccac ctcctgggga gccgagagtg atagtgtagt agagctagga ggagagggtc    1080

ctggagaagc gtggaccggt ccgggtgggt tccggcaggt tctcaccctc tctaggcccc    1140

attctcctct gcactgtaac atttgaggcc cacgcacaca gtccctcccc aggtctcagg    1200

gttgggcaca gagtagggcc ctgggcaggg atgggggtg gcagtgtctc caacgcccct    1260
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tccagcctgg actgtgagcc atccaagtgt tggcaaagga ccctgtgctg gatgccccg       1320

cccggcacac cccactgacc ctccccctgc ccccacccgg cacaccctgc tcaccctgct       1380

caccctgccc ctgcccctgc ccctgcctgc ag                                    1412
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<210> SEQ ID NO 14
<211> LENGTH: 6
<212> TYPE: PRT
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: synthetic peptide

<400> SEQUENCE: 14

Gly Gly Gly Gly Asp Asp
1   5

<210> SEQ ID NO 15
<211> LENGTH: 8
<212> TYPE: PRT
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: synthetic peptide

<400> SEQUENCE: 15

Gly Gly Gly Gly Gly Gly Asp Asp
1   5

<210> SEQ ID NO 16
<211> LENGTH: 10
<212> TYPE: PRT
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: synthetic peptide

<400> SEQUENCE: 16

Gly Gly Gly Gly Gly Gly Gly Gly Asp Asp
1   5   10

<210> SEQ ID NO 17
<211> LENGTH: 12
<212> TYPE: PRT
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: synthetic peptide

<400> SEQUENCE: 17

Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Asp Asp
1   5   10

<210> SEQ ID NO 18
<211> LENGTH: 7
<212> TYPE: PRT
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: synthetic peptide

<400> SEQUENCE: 18

Ala Ala Ala Ala Ala Ala Asp
1   5

<210> SEQ ID NO 19
<211> LENGTH: 8
<212> TYPE: PRT
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: synthetic peptide

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<400> SEQUENCE: 19

Ala Ala Ala Ala Ala Ala Asp Asp
1               5


<210> SEQ ID NO 20
<211> LENGTH: 7
<212> TYPE: PRT
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: synthetic peptide

<400> SEQUENCE: 20

Ala Ala Ala Ala Ala Ala Lys
1               5


<210> SEQ ID NO 21
<211> LENGTH: 8
<212> TYPE: PRT
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: synthetic peptide

<400> SEQUENCE: 21

Ala Ala Ala Ala Ala Ala Lys Lys
1               5


<210> SEQ ID NO 22
<211> LENGTH: 7
<212> TYPE: PRT
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: synthetic peptide

<400> SEQUENCE: 22

Val Val Val Val Val Val Asp
1               5


<210> SEQ ID NO 23
<211> LENGTH: 8
<212> TYPE: PRT
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: synthetic peptide

<400> SEQUENCE: 23

Val Val Val Val Val Val Asp Asp
1               5


<210> SEQ ID NO 24
<211> LENGTH: 7
<212> TYPE: PRT
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: synthetic peptide

<400> SEQUENCE: 24

Val Val Val Val Val Val Lys
1               5


<210> SEQ ID NO 25
<211> LENGTH: 8
<212> TYPE: PRT
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: synthetic peptide
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<400> SEQUENCE: 25

Val Val Val Val Val Val Lys Lys
1               5


<210> SEQ ID NO 26
<211> LENGTH: 7
<212> TYPE: PRT
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: synthetic peptide

<400> SEQUENCE: 26

Leu Leu Leu Leu Leu Leu Asp
1               5


<210> SEQ ID NO 27
<211> LENGTH: 8
<212> TYPE: PRT
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: synthetic peptide

<400> SEQUENCE: 27

Leu Leu Leu Leu Leu Leu Asp Asp
1               5


<210> SEQ ID NO 28
<211> LENGTH: 7
<212> TYPE: PRT
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: synthetic peptide

<400> SEQUENCE: 28

Leu Leu Leu Leu Leu Leu Lys
1               5


<210> SEQ ID NO 29
<211> LENGTH: 8
<212> TYPE: PRT
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: synthetic peptide

<400> SEQUENCE: 29

Leu Leu Leu Leu Leu Leu Lys Lys
1               5


<210> SEQ ID NO 30
<211> LENGTH: 19
<212> TYPE: RNA
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: synthetic RNA

<400> SEQUENCE: 30

uucuccgaac gugucacgu                                                     19


<210> SEQ ID NO 31
<211> LENGTH: 19
<212> TYPE: RNA
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: synthetic RNA

<400> SEQUENCE: 31
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acgucacacg uucggagaa                                              19


<210> SEQ ID NO 32
<211> LENGTH: 22
<212> TYPE: RNA
<213> ORGANISM: Artificial Sequence
<220> FEATURE:
<223> OTHER INFORMATION: synthetic RNA

<400> SEQUENCE: 32

uaccugaauu cccaaaagcu uu                                          22
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The invention claimed is:

1. A cancer therapy method, the method comprising administering to a cancer patient a therapeutically effective amount of an anti-cancerous pharmaceutical composition comprising an RNA, which functions as a mature-miRNA, wherein the RNA comprises:
   (i) a mature-miRNA consisting of the sequence of SEQ ID NO:8;
   (ii) a mature-miRNA consisting of the sequence of SEQ ID NO:8 having a substitution, addition, and/or deletion of 1-2 bases and having a cancer therapeutic effect; or
   (iii) an RNA consisting of 90% or more sequence identity to a mature-miRNA consisting of the sequence of SEQ ID NO:8 and having a cancer therapeutic effect,
   wherein said cancer is a solid cancer.

2. The method according to claim 1, wherein said solid cancer is colon cancer, pancreatic cancer, tongue cancer, mesothelioma, uterine sarcoma, osteosarcoma, breast cancer, lung cancer, or head and neck cancer.

3. The method according to claim 1 wherein said RNA is chemically modified.

4. The method according to claim 3, wherein said chemical modification is one or more chemical modifications selected from the group consisting of LNA-tion, BNA-tion, ENA-ation, 2'-OMe modification, phosphorothioation, S-TuD-ation, morpholino modification, peptide addition, glycosylation, aptamer addition, hydrophobic molecule addition, polymer addition, and addition of unmodified DNA.

5. The method according to claim 1, wherein the anti-cancerous pharmaceutical composition further comprises a nucleic acid transfection agent.

6. The method according to claim 5, wherein said transfection agent is a lipid-based transfection agent, a polymer-based transfection agent, a magnetic particle-based transfection agent, an exosome for nucleic acid delivery, or a viral protein for nucleic acid delivery.

7. The method according to claim 6, wherein said transfection agent is a transfection agent comprising a peptide represented by amino acid sequences GGGGDD (G4D2) (SEQ ID NO:14), GGGGGGDD (G6D2) (SEQ ID NO:15), GGGGGGGGDD (G8D2) (SEQ ID NO:16), GGGGGGGGGGDD (G10D2) (SEQ ID NO:17), AAAAAAD (A6D) (SEQ ID NO:18), AAAAAADD (A6D2) (SEQ ID NO:19), AAAAAAK (A6K) (SEQ ID NO:20), AAAAAAKK (A6K2) (SEQ ID NO:21), VVVVVVD (V6D) (SEQ ID NO:22), VVVVVVDD (V6D2) (SEQ ID NO:23), VVVVVVK (V6K) (SEQ ID NO:24), VVVVVVKK (V6K2) (SEQ ID NO:25), LLLLLLD (L6D) (SEQ ID NO:26), LLLLLLDD (L6D2) (SEQ ID NO:27), LLLLLLK (L6K) (SEQ ID NO:28), or LLLLLLKK (L6K2) (SEQ ID NO:29).

8. The method according to claim 1, wherein the composition is for topical administration.

9. The method according to claim 1, wherein the method is used in combination with other anticancer agents.

10. The method according to claim 9, wherein said other anticancer agents are one or more anticancer agents selected from the group consisting of an alkylating agent, a platinum preparation, a metabolism antagonist, a topoisomerase inhibitor, a microtubular inhibitor, an anti-cancerous antibiotic, a molecular target drug, a hormone preparation, an immunomodulation drug, an interferon, an interleukin, a plant-derived anticancer agent, and a BRM preparation.

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